

FLIGHT

THE AIRCRAFT ENGINEER

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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and The Aircraft Engineer

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EDITORIAL COMMENT

RUMOUR is busy with all sorts of reports relating to the hold-up of any announcement of the Government policy in the matter of the encouragement of civilian aviation. It has been argued at length and everyone is agreed—including the Government themselves—that the proper development of the aerial movement is far too huge an affair to be carried out by private enterprise alone. If this country is to maintain the commanding lead in aviation to which it attained during the war, it is quite clear that the State must come to the help of the industry by finding a great proportion of the funds that will be necessary to set going the network of overseas services that the needs of the future will demand. That is admitted by the Government, as we have said, and so far we may consider the position to be satisfactory. But it is when we come down to discussion in detail that matters do not appear to be anything like as clear as we could desire. It is now a month since General Sykes was appointed Controller of Civilian Aviation, but with his appointment the whole interest would almost appear to have ceased. If he is to make a

success of his department, he must be properly backed by the Government, and must have sufficient funds to admit of the formation of a sufficient and competent staff, and for the immediate needs of the civilian section. It seems reasonable to suppose that these matters were foreseen long before the decision to appoint him was taken, yet, if report does not lie, the principal characteristic of the department is chaos. It scarcely needs to be pointed out that unless that department is at once put on a proper footing it is perfectly hopeless to expect anything in the way of development to proceed.

The Air Ministry, doubtless for the reason that the Treasury blocks the way, does not appear to have a definite policy. The present industry together with those capitalists who are waiting to put money into civil aviation enterprises, obviously cannot move until the Government discloses its full policy and, as that is lacking, everything is held up for the time being. In an interview with the *Times*, Mr. Handley Page sums up the situation by saying:—

"Without a doubt one wants to know the answers to a thousand and one questions concerned with the starting of air routes and their administration where the commercial side of flying runs hand in hand with Government policy, and to all these questions it is very difficult at present to get replies conveying definite information. At the same time one can appreciate that there are many difficulties which the Department has to overcome in order to deal with these things. First of all there must be broad methods of national policy involved which are outside the scope of the Department of Civilian Aviation, and with other Government Departments fully occupied with the Peace Conference it is difficult for the aviation section to get definite decisions. The result of the delay, however, is becoming serious, and it is very necessary that a policy should be laid down so that the aircraft industry may go ahead instead of being checked, and may thus maintain our position at the head of the aircraft construction of the world, and, if possible, increase our lead."

The main difficulty seems to be that of finance. With the prospect to be faced of having to budget for £1,500,000 for the next financial year, it is perhaps not to be wondered at that the Treasury should be disinclined to state definitely what sums it is prepared to allocate to the development of civilian flying. But it has got to be done if we are

to maintain our place, and a Chancellor with the necessary courage and breadth of vision would not hesitate to take Parliament and the nation into his confidence and say outright what it is he proposes to do.

Possibly something may be said during the discussion on the Air Force Vote. This Vote will, without doubt, include a sum for civilian development and we may, therefore, know within the next few days where we stand in the matter. But delay is dangerous. Every day that is lost sees our rivals going ahead with their preparations and unless we want to be left at the post it is essential that the Government should state the broad lines of its policy forthwith.

The Question of Standardisation

The *Times* Paris correspondent, in an article which seems to bear the impress of inspiration, commits himself to the expression of an opinion that: "In the standardisation of aircraft lies the secret of success in the air. The Americans realised this when they started the Liberty engine. If British commercial flying is to be developed to the full, there must be a standard British engine adopted for the whole Empire. The paramount importance of this single fact must be understood. The stations on the Imperial air routes will not be able to stock spare parts for more than one type of engine, or be staffed by mechanics expert in more than one machine. It follows that none but the standard machines will be able to use the great routes unless they carry their own spare parts and mechanics, which at once reduce their capacity for freight. If a standard engine is at once adopted, and the Imperial air routes stocked and staffed to meet its needs, not only will the Empire profit by better communications, but British industry will receive support of incalculable value, since other European countries will be bound to adopt British engines and British machines if they are to use the British routes. A practical monopoly of commercial aeroplanes in the Eastern hemisphere lies before the British industry if the Government will take prompt and energetic action."

As a piece of special pleading, this is not at all bad. But the weakness of it lies in the fact that the opinions expressed are in direct conflict with the views of the leading constructors and experts of the aviation world. The answer is very well given by Mr. Handley Page, for instance, when he says that obviously the simplest thing would be to have only one type of engine and one type of machine. In the same way it would be cheaper to have only one type of motor-car and one standard pattern of clothes! It is to be doubted if even the most convinced advocates of standardisation could be got to vote for a single pattern of anything but aero engines and aeroplanes! Attractive as the proposition seems on the face of it—and its very attractiveness is its danger—it should be sufficiently obvious that standardisation such as that suggested would kill enterprise right at the very start. It would retard progress and tend to concentrate the whole industry in a few hands, leading to trust domination and stagnation, which would be against all the best interests of the industry and of the world at large. The question is one which has been very much debated in the past, and will doubtless be discussed in the future to an equal

or even greater extent. Our own views are so well known that it would be a work of supererogation to repeat them again. Standardisation, to our way of thinking, is the refuge and the argument of those who desire, for the sake of saving a little initial trouble, to take the line of least resistance.

The Amateur Steps In

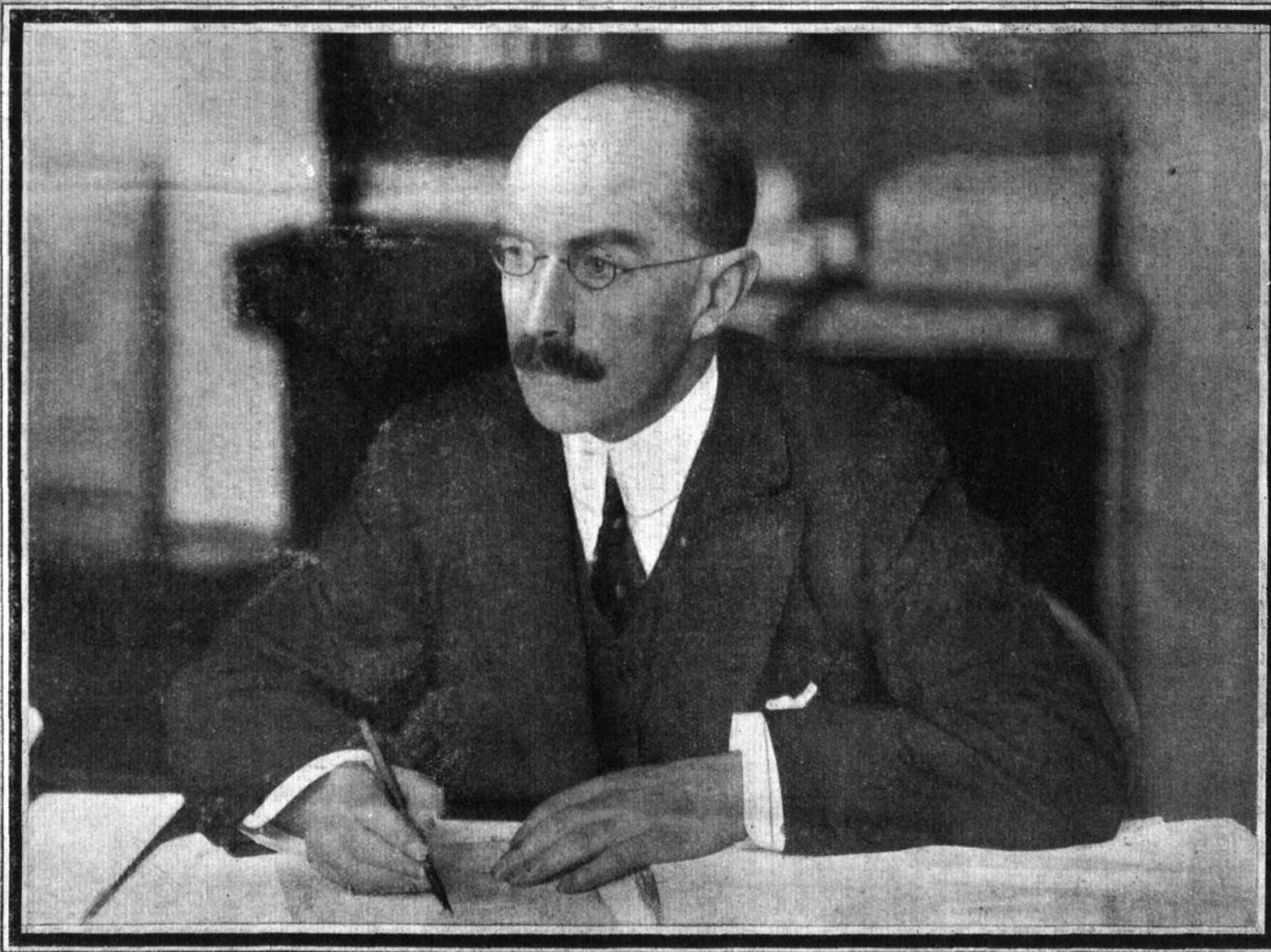
We have the greatest respect for Sir Woodman Burbidge as the successful administrator of one of the greatest retail business enterprises in the country, but we confess we do not feel quite the same admiration for him when he sets out to lay down the law regarding the steps to be taken to develop civilian flying.

Sir Woodman appears to have taken advantage of the facilities afforded by aerial transport to pay a literally flying visit to Brussels a week or two ago, and on the strength of that he has been telling the *Times* what the Government ought to do to assist in development. To a certain extent, we are in agreement with him. For instance, he suggests that the Department of Civilian Aviation should be recognised as a distinct unit of the Air Ministry and be equipped with sufficient initiative powers to undertake important enterprises. A bold step of this kind, he thinks, would be of great assistance to reconstruction and the development of commerce. Quite so. But when asked by his interviewer what might be regarded as a reasonable sum of money to be found by the Government for the development of civil aviation during the coming year, he said the expenditure of "any amount up to £5,000,000 might prove to be a sound national investment!"

To our mind, for a prominent business-man to talk like this is frankly mischievous. Five millions—and it is better to face the facts at the start—is a mere moiety of what is required. Doubtless Sir Woodman is entirely ignorant of the fact that there is at the present moment one scheme afoot for which no less a sum than fifty millions is required—and that is, as we say, only one of several. Of course, if Sir Woodman—as would almost appear from certain remarks he let fall in connection with cross-Channel services—does not see any more in civilian aviation than a ready means for the conveyance of millinery between Paris and the Brompton Road, no doubt he can have his service, and a good one at that, for the five millions he wants the Government to find during the ensuing year. But if he can bring himself to visualise the great series of aerial services over the Imperial routes now being mapped out, he must be driven to admit that his ideal of a paltry five millions is merely parochial. After all, we have been spending seven millions a day on beating Germany in the war and, if we are agreed that civilian aviation is going to be of profit to the Empire—as we must be—we shall have to think largely and make up our minds that the money must be found somehow and somewhere.

In any case, it would be much better if men who are regarded by the public as among our leading men of affairs would refrain from making doubtful estimates for publication of the presumable cost of establishing Empire aerial services. It does no good, inasmuch as it tends to create a false atmosphere and does not enhance the person concerned in the eyes of those who have really given their attention to the subject.

MARCH 13, 1919



Sir WILLIAM ARTHUR ROBINSON, K.C.B., Secretary to the Air Ministry.

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FLIGHT
MARCH 13, 1919

The Control of Civil Aviation

Reports have been current to the effect that it was the intention of the Government ultimately to place the control of civil aviation in the hands of the Ministry of Ways and Communications—assuming that the Bill now before Parliament should pass into law in something like its present form. We are exceedingly thankful to be assured that this is not so. The Air Ministry has officially pointed out that under the terms of the Air Navigation Act, 1919, the purposes of the Air Council have been extended to include all matters connected with air navigation.

We had never attached any particular importance to the rumours that aerial navigation would come under the control of the Ministry of Ways and Communications, else we should have dealt at length with the reasons against such a course being taken. At the same time, it is reassuring to know that it is not contemplated to treat aviation in the manner presumptively reserved for the highways and their traffic. The position of aerial navigation is not superlatively happy as it is. But even so it is a thousand times more hopeful than it could possibly be were its future to be placed in the hands of a bureaucracy whose interests are railway interests and those only. The development of the commercial side of aviation is hung up as it is, pending the decision of the Government as to what sums of money can be allocated to it. If it were placed under the proposed new Ministry, we simply cannot see any money at all being found for it, except under the influence of the most extreme pressure from outside the Ministry and even then we cannot visualise anything but an administration of acute parsimony towards the new transport.

Although, as we have said, the present policy is to keep commercial aviation free from the trammels of railwaymen's control, it will not do to allow ourselves to be lulled into a sense of false security. If the Bill for constituting the Ministry of Ways and Communications is allowed to pass as it stands, or with merely superficial modifications, we may be very sure that Sir Eric Geddes and his people will do their very best to get their hands on *all* transport, aerial as well as marine and on land. Once the Ministry is constituted and they are in power, there would begin a fight for still further power, particularly over aviation. Money has got to be found to develop the Imperial air routes and in large sums. The temptation to get control of this money would be too great to be resisted. To think of tens of millions, which could be used for patching and extending the railways, being expended on the establishment of aerial transport routes to render the railways more and more out of date and useless, would be too much and we should have to see to it that every penny of the votes was expended in the exact direction indicated by Parliament. That would be infinitely more trouble and a great deal less satisfactory than taking the proper action *now*. Although for the purposes of aerial navigation we are not at present directly concerned with the Bill, we shall assist to remove the danger of the future by vigorously opposing it. We suggest, therefore, that every reader who values the future of aviation should write to his Member, recording his protest against the Bill and requesting him to vote against the second reading on Monday next. It is a vicious Bill, apart altogether from any possible effect it may have

on aerial navigation. It creates a bureaucracy of the exact type against which we have been fighting for more than four years. We have waged the greatest war in history to free the world from the institutions which the Government are now attempting to fasten upon this country in the name of progress and reconstruction.

Aircraft Insurance Developments

According to an official communication forwarded to us, a corporation to be known as the Aviation Insurance Association has been formed to undertake the covering of aircraft risks. It intends to accept at home and abroad all risks in connection with heavier and lighter than air craft. Policies will be issued by underwriting members of Lloyd's, the Eagle, Star and British Dominions Co., and the Excess Insurance Co. A committee has been appointed, consisting of some of the best-known men in the insurance world, and this committee has been fortunate enough to secure the services of Capt. Horatio Barber, R.A.F., who has been a well-known figure in aviation for a number of years. Our readers will probably remember him best as a pioneer with his Valkyrie monoplane, which he designed in the early days of the movement. He was the first man in Great Britain to receive an aeronautical degree, has had long experience as pilot, designer and constructor, and built the first all-British passenger carrying machine. In addition, it was he who made the first flight on Salisbury Plain, and built the first public hangars at Hendon, while he has also designed and piloted airships. Before the war he was engaged as a consultant on aviation and had a large practice which included members of Lloyd's whom he advised on all questions relating to aircraft insurance. It will be appreciated, then, that the new association is exceedingly fortunate in having secured the services of so notable an expert to advise them in all the details of a business which, while it is not new, has more than one feature at present indeterminate. Aircraft insurance is a branch of the business which will require very careful initial handling combined with close knowledge of the subject and considerable breadth of outlook. These qualities Capt. Barber possesses in marked degree and we congratulate the Association on their choice.

In the preliminary prospectus issued by the Association the point is made that immediate profit-earning is not the primary object of those concerned; in fact, the Association itself will not be a money-making concern at all, it being more an advisory asset. The wide view is apparently taken that underwriters should, as a national duty, do what they can to encourage commercial aviation, and, without adequate insurance facilities, development must be retarded. Aviation risks have been placed at Lloyd's for some years past, but enterprising underwriters feel that the time has come now to provide a much larger market than has hitherto existed. Therefore, those who are behind the new scheme—who are all men of substance—are determined to provide an insurance market for aviation risks, and are resolved that rates shall not be prohibitive, but such as will encourage commercial aviation.

The risks for which quotations will be made are of various kinds. They are:—

(1) The risk of damage to flying machines through all causes, including collision, fire, and theft.

(2) The third-party risk, as in the case of dropped tools or equipment which injure persons or damage property on the earth.

(3) The risk of injury to pilots, crews, and passengers.

(4) The risk of accidental damage to goods carried.

(5) The risk of damage to property against which owners may wish to insure, as they did against the risk of injury through air attack during the war.

In assessing the premiums for any of the first four risks the underwriter will take into account—

(a) The type of machine and the circumstances of its construction.

(b) The experience of the pilot.

(c) The route of the proposed voyage.

(d) The nature of the flying, whether by day or

night, or by both, and whether the flying will be "straight" or whether any "stunts" will be attempted.

We feel certain that all who have even the slightest interest in the development of commercial aviation will welcome the announcement with the liveliest satisfaction. It is an undoubted fact that such a scheme of insurance as is outlined in the Association's prospectus is an absolute necessity if aviation is to develop along expansive lines. Therefore, the Association has set out on a programme of business which is certain to prove of the greatest public benefit. By its constitution and by the names of those standing behind it, the fullest measure of public confidence is assured. More than that it is quite unnecessary for us to say.



THE ZEPPELIN GIANT AEROPLANE.—Looking down from the machine gunner's nest at the two pilots, the observer, and the commander.

THE SIEMENS TYPE D IV SINGLE-SEATER FIGHTER

DURING the latter part of the War, a good deal was heard of the Siemens Single-Seater, but little reliable information concerning this machine was available. It was said that it had an extraordinarily good (for a German) climb, manoeuvred exceptionally well, and was strong enough to be "spun" with the engine running. The engine was thought to be a Siemens rotary, said to give exceptional power for its weight, and to be particularly good for altitude work. The reports, as is so often the case in such circumstances, differed greatly, and varied from the statement that this machine was no good

new machine, type D IV, is shown in the accompanying illustrations.

The total span of the D IV is 8m.35, with a chord of 1 m. There is neither dihedral nor sweepback. The weight of the machine empty is 525 kg.

Concerning the Siemens rotary engine, only a brief reference will be made to this, a more detailed description being reserved for a future occasion. The 200 h.p. 11-cylinder motor is a development of the previous 9-cylinder engine of 110 h.p. It differs from that engine in that, whereas in the



THE SIEMENS SINGLE-SEATER.—Front view.

at all, to the opinion that it was better than anything we had at the time. As frequently happens, the truth, judging from the following description, which is translated from the German aviation journal *Flugsport*, is somewhere in between the two extremes. The machine is undoubtedly one of the best German machines of which detailed particulars are available, but at the same time does not come up to our best. Thus *Flugsport* :—

In January, 1918, the Siemens-Schuckert Works brought out, in a competition for this class at Adlershof, a single-seater fighter known as the D III. This machine, which had a Siemens-Halske rotary motor with 11 cylinders, had a climb

smaller motor the crankshaft was stationary and the cylinders revolved, in the new engine the crankshaft revolves in one direction and the cylinders in the opposite direction. The cylinders revolve at the rate of 900 r.p.m. in one direction, and the crankshaft makes 900 r.p.m. in the opposite direction. This is equivalent to an engine speed of 1,800 r.p.m., while the speed of the airscrew is only 900 r.p.m.

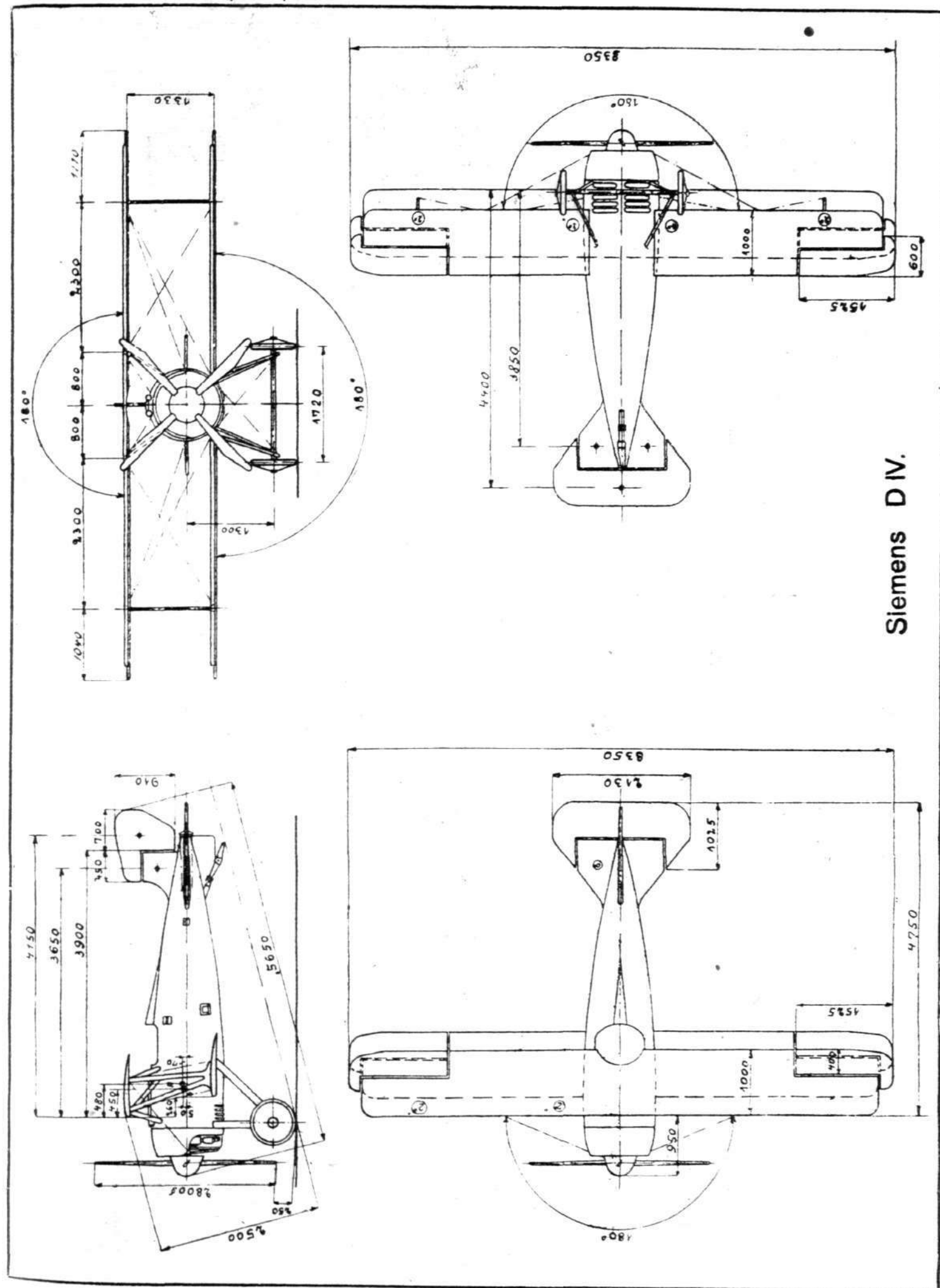
The arrangement of having the two masses rotating in opposite directions is attended by the following special advantages: The low speed of the airscrew results in a better propeller efficiency, which means a greater useful thrust. On account of the low speed of the cylinders the centrifugal



THE SIEMENS SINGLE-SEATER.—Rear view.

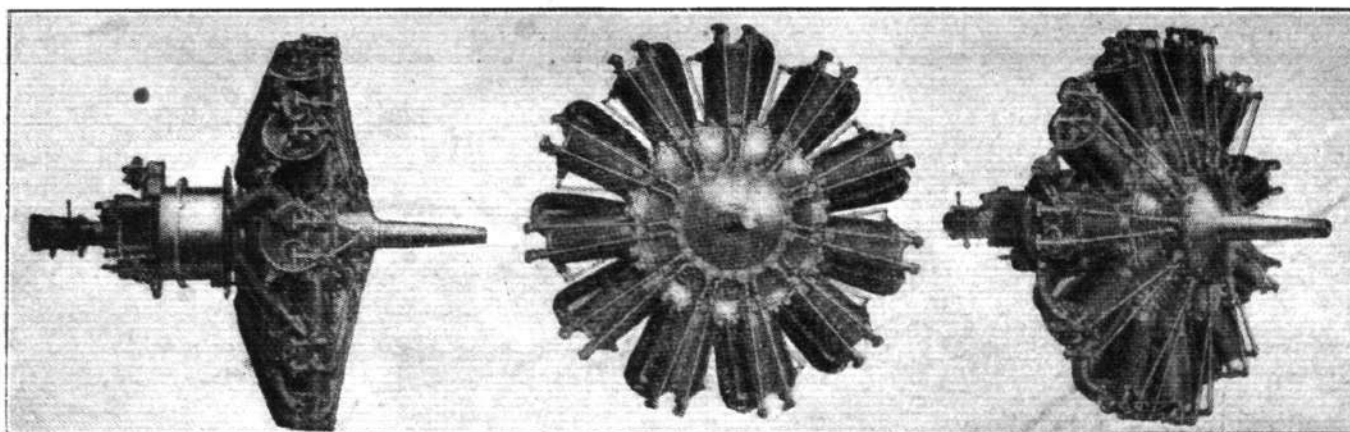
that greatly exceeded the specifications of that time, and had at the same time a sufficient horizontal speed and good manoeuvrability. In order to improve upon this type, the speed was increased at the cost of climb, and the shape and section of the main planes were altered accordingly. The

force is smaller, which makes for reliability. The high virtual speed of the engine (by having cylinders and shaft revolving in opposite directions—Editor *FLIGHT*) results in greater power and lighter engine weight. On account of the low speed of the cylinders, air resistance is decreased, resulting



Siemens D.V.

THE SIEMENS SINGLE-SEATER.—Side and front elevations, and plans from above and beneath.

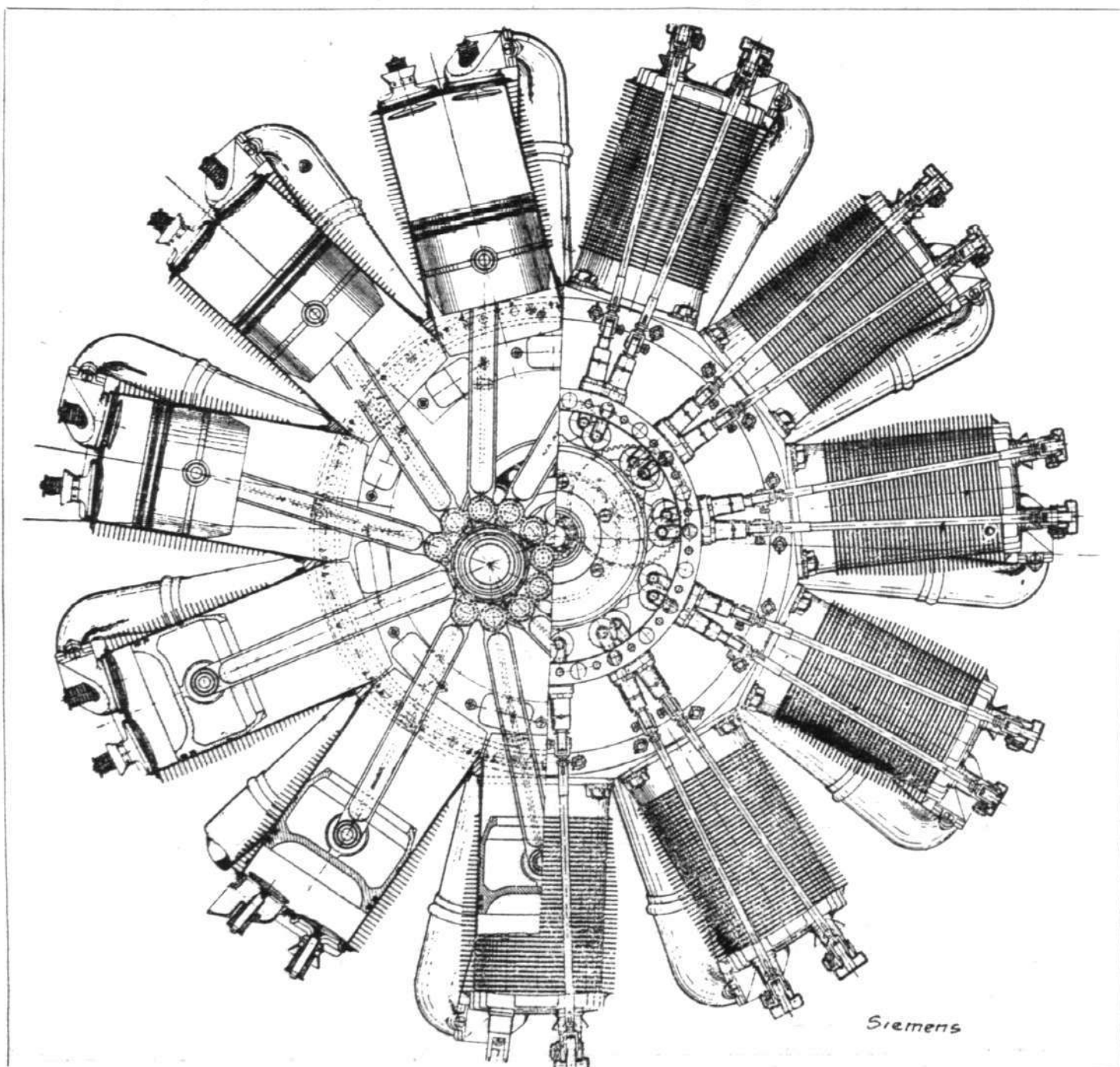


THREE VIEWS OF THE SIEMENS-HALSKE ROTARY ENGINE.—In this engine the cylinders and crankshaft rotate in opposite directions.

in a better efficiency. By having the masses revolving in opposite directions gyroscopic force is approximately eliminated, which is an advantage for manœuvring. The petrol consumption is far lower than that of any other rotary, and is about the same as that of stationary engines.

The Siemens rotary can be throttled down from 900 r.p.m. to 1350 r.p.m. The cylinders can be easily removed, and by fitting dual magnetos the reliability is increased. The

engine can be started by means of a hand-operated magneto. Both inlet and exhaust valves are mechanically operated, and the motor is over-dimensioned, and consequently suitable for work at great altitudes. The normal brake horse-power is 200 h.p. and the maximum power 240 h.p., for a total engine weight, ready for running, of 194 kg. This gives a weight per horse-power of 0.81 kg. If one at the same time bears in mind the low speed of the airscrew, resulting in a good



THE SIEMENS-HALSKE ROTARY ENGINE.—Part-sectional view.

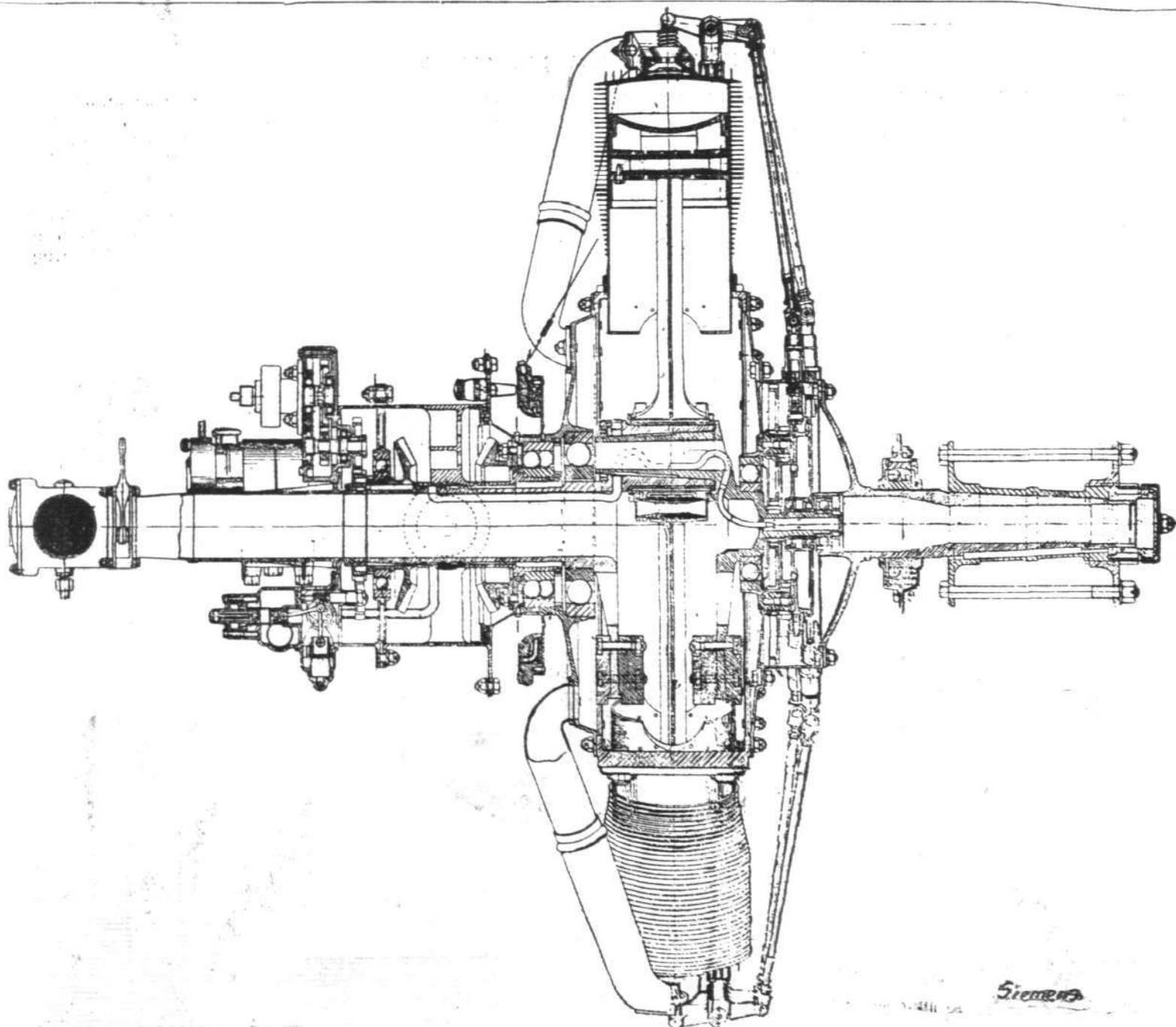
efficiency, of 68 per cent. or so, the value of the engine will be apparent. (A propeller efficiency of 68 per cent. does not impress one particularly.—Editor *FLIGHT*.) The value of the ratio $\frac{\text{lbs. thrust}}{\text{lbs. weight of engine} + \text{weight of screw}}$, should be very good.

The engine is hung on its three supports in a wrought-iron frame, which is attached by suitable fittings to the four *longerons* of the fuselage. Later types are improved by making the engine quickly removable with its cowling arrangement. The aluminium cowl round the motor ensures proper cooling and prevents the used oil from being thrown out. The oil tank is mounted behind the engine in order to protect it from the cold, and a short distance behind it is mounted the petrol tank which is arranged for gravity feed. The two tanks are bolted together, and may be put into and taken out of the machine as a unit. In later types the oil tank is built with double walls, the space between which is packed with heat-insulating material so that the oil, even at the greatest altitudes, retains its proper consistency.

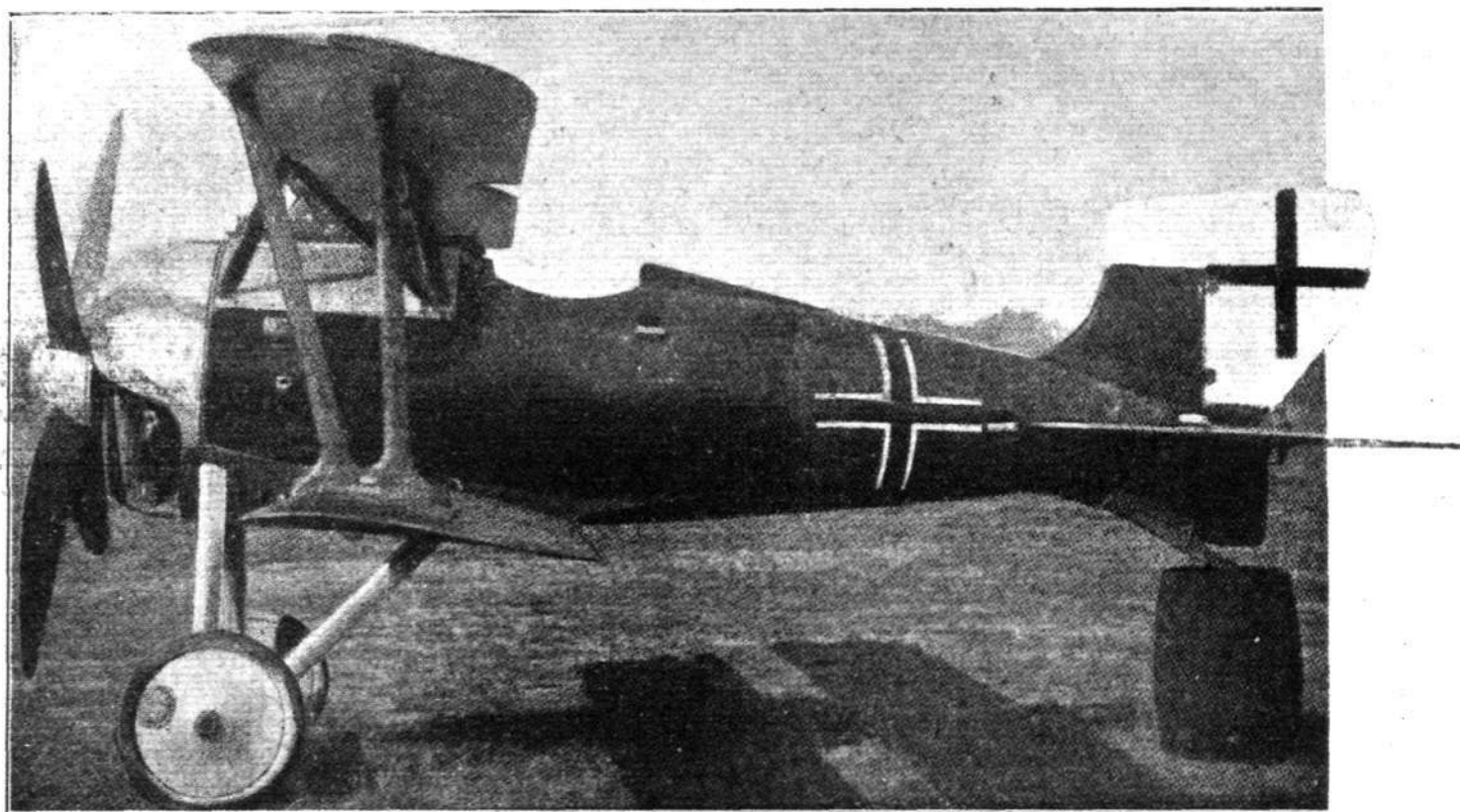
The air screw is a four-bladed tractor, with the four blades glued together in one plane. Its diameter is 2m.80 and the pitch 3m.90. The four-bladed screw, as shown by experiments, has certain advantages over the two-bladed, without, in the present case, having a lower efficiency than the latter. Thus the under-carriage is lower, which facilitates landing at the high speed of this machine.

The fuselage is built of three-ply wood, and is designed for the lowest possible head resistance. The framework is

formed by a series of transverse formers or bulkheads and four pine *longerons*, and to this the three-ply planking is tacked. Of particular interest, are the diagonal formers running from bulkhead to bulkhead. These give great rigidity to the structure. Growing out of the main body and built integral with it are the vertical fin and horizontal tail plane, as well as the lower fin, which forms a support for the tail skid. The tail plane, which is of the symmetrical type, is set at an angle of incidence of 0 deg. while the vertical fin is cambered on one side only, in order to counteract the turning moment caused by the propeller torque. To the tail plane is hinged in the usual manner the one-piece, balanced elevator. The rudder is placed wholly above the elevator. Both rudder and elevator are built up of steel tubes with ribs of sheet steel, and the control cables, which are in duplicate, are so arranged as to nowhere pass over pulleys. The pilot's seat is mounted on duralumin tubes and is adjustable in two directions. The safety belt is attached to the upper *longerons* via coil springs. One of the accompanying illustrations shows the interior of the pilot's cockpit, which is equipped with the usual instruments: Revolutions-counter, compass, altimeter, throttle levers, switches, magneto switches, and petrol tap, etc. The control lever carries at its upper end a handle of the type that has been standardised by the German authorities (*Heeresverwaltung*), and the left side of which is arranged as a throttle lever. By a special locking arrangement, the control lever may be locked in any position. The longitudinal rocking shaft, which is forked round the control lever, carries at its front end a double crank for the



THE SIEMENS-HALSKE ROTARY ENGINE.—Sectional side elevation.

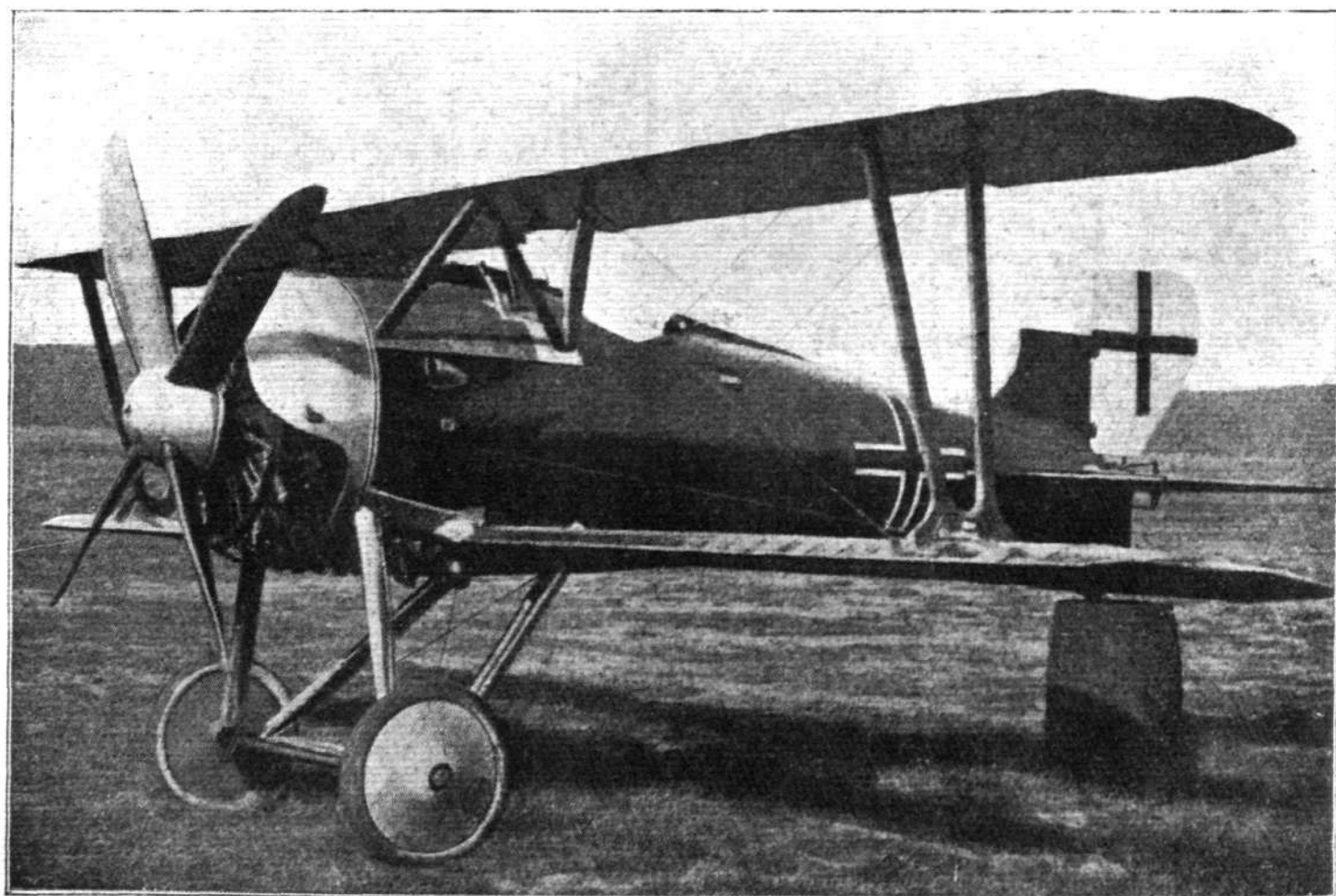


THE SIEMENS SINGLE-SEATER.—Side view.

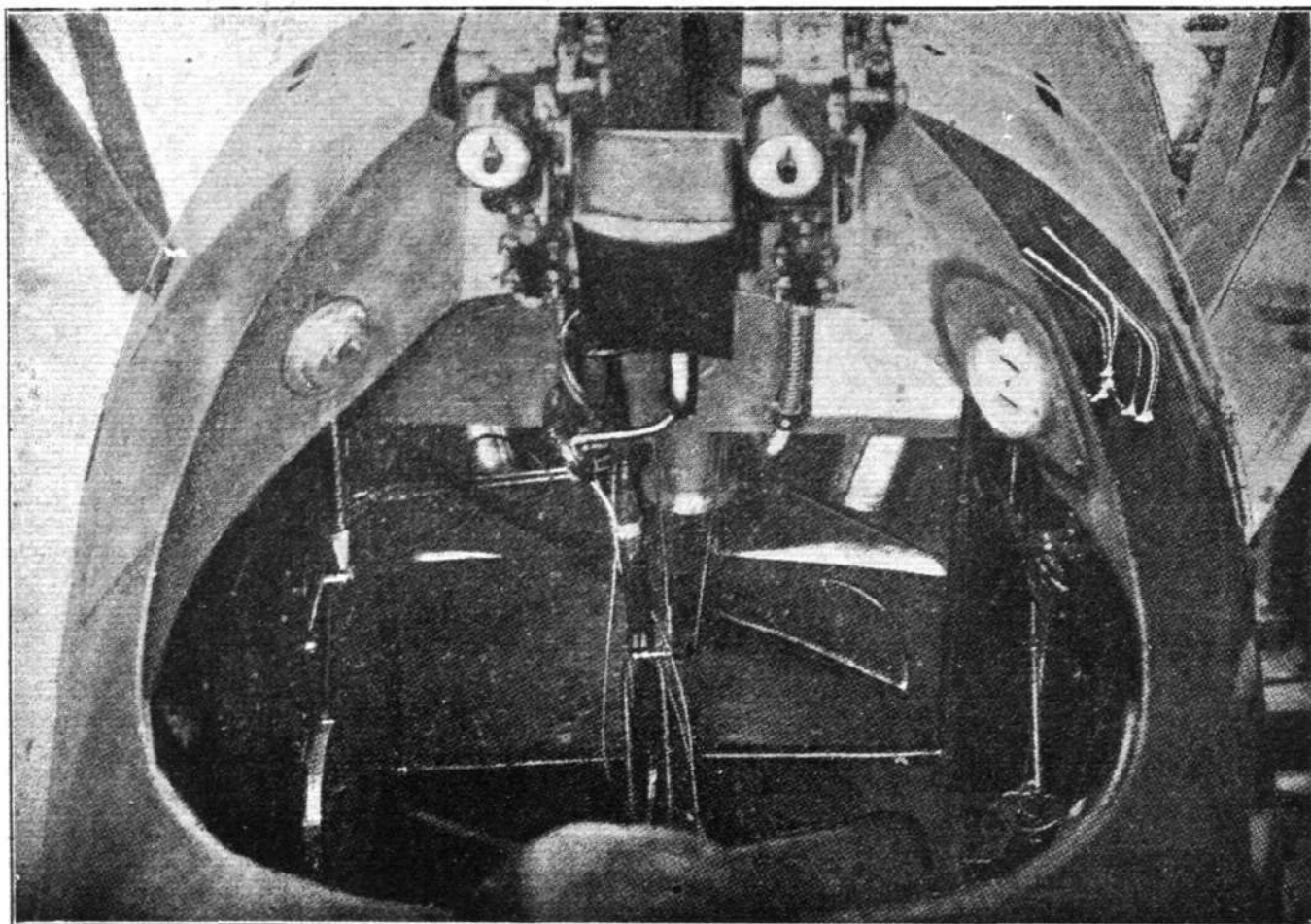
aileron control. The latter is in the form of steel tubing throughout in order to minimise danger of damage by bullets.

To the front part of the *fuselage* is attached the undercarriage, which is built of steel tube throughout. It is held together by a cross tube behind the axle and by diagonal bracing in the rear bay only. The wheel axle, which is a nickel chrome steel tube of 55 mm. diameter, is slung from the struts by coil springs wrapped around the axle. As circular section tubes are employed for the undercarriage

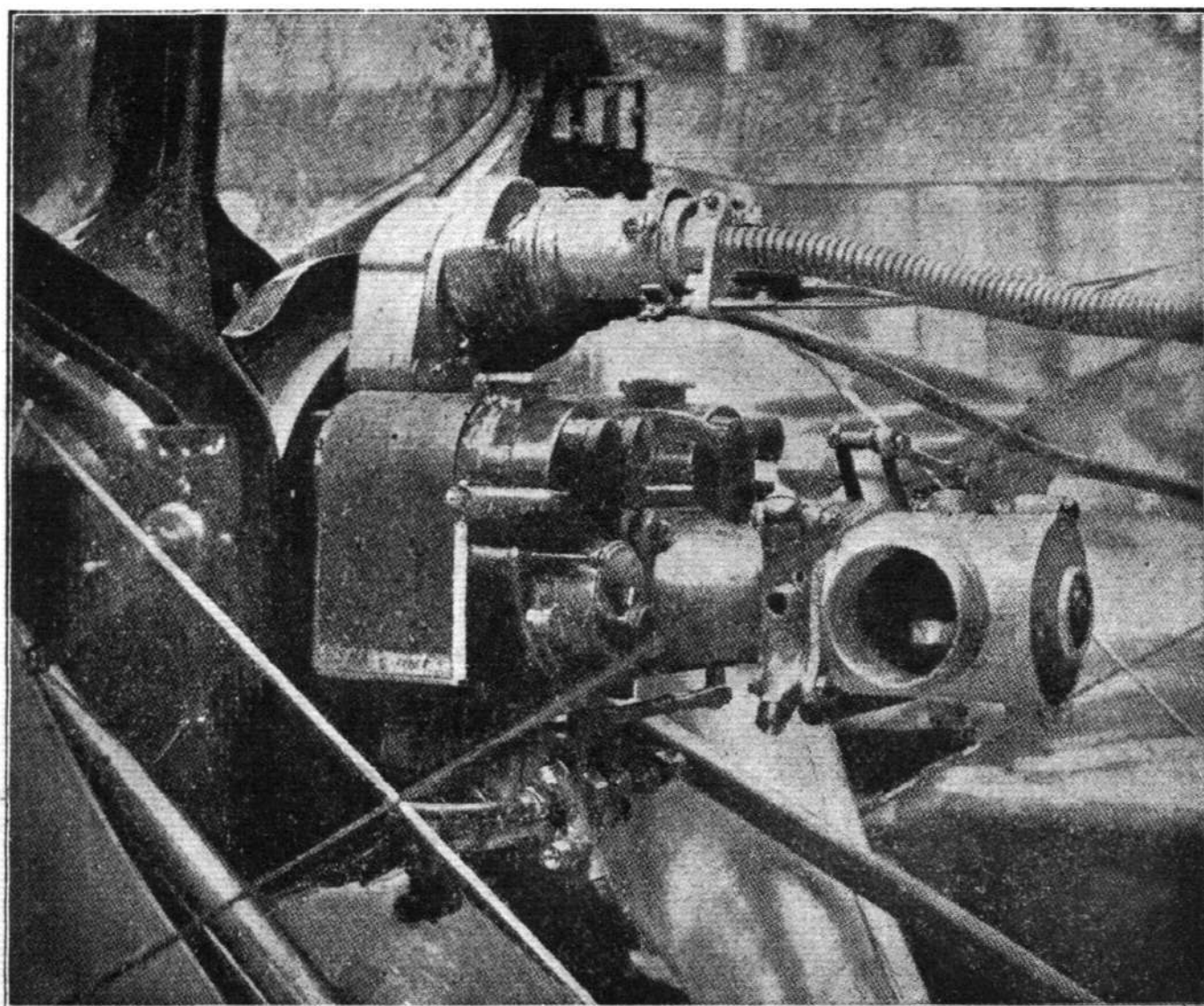
struts, these have been streamlined with sheet aluminium. The upper plane is in one piece, and has spars of the box type, the spars being made by spindling out two halves to the desired section. Where struts, etc., occur, the spars are left solid. The ribs are built up of webs of 1.5 mm. three-ply wood, with flanges of pine. The ribs, which are placed 160 mm. apart, are carefully secured to the spars by small blocks of wood, glued on. The internal wing bracing is in the form of steel tube compression struts and steel wires. The wing



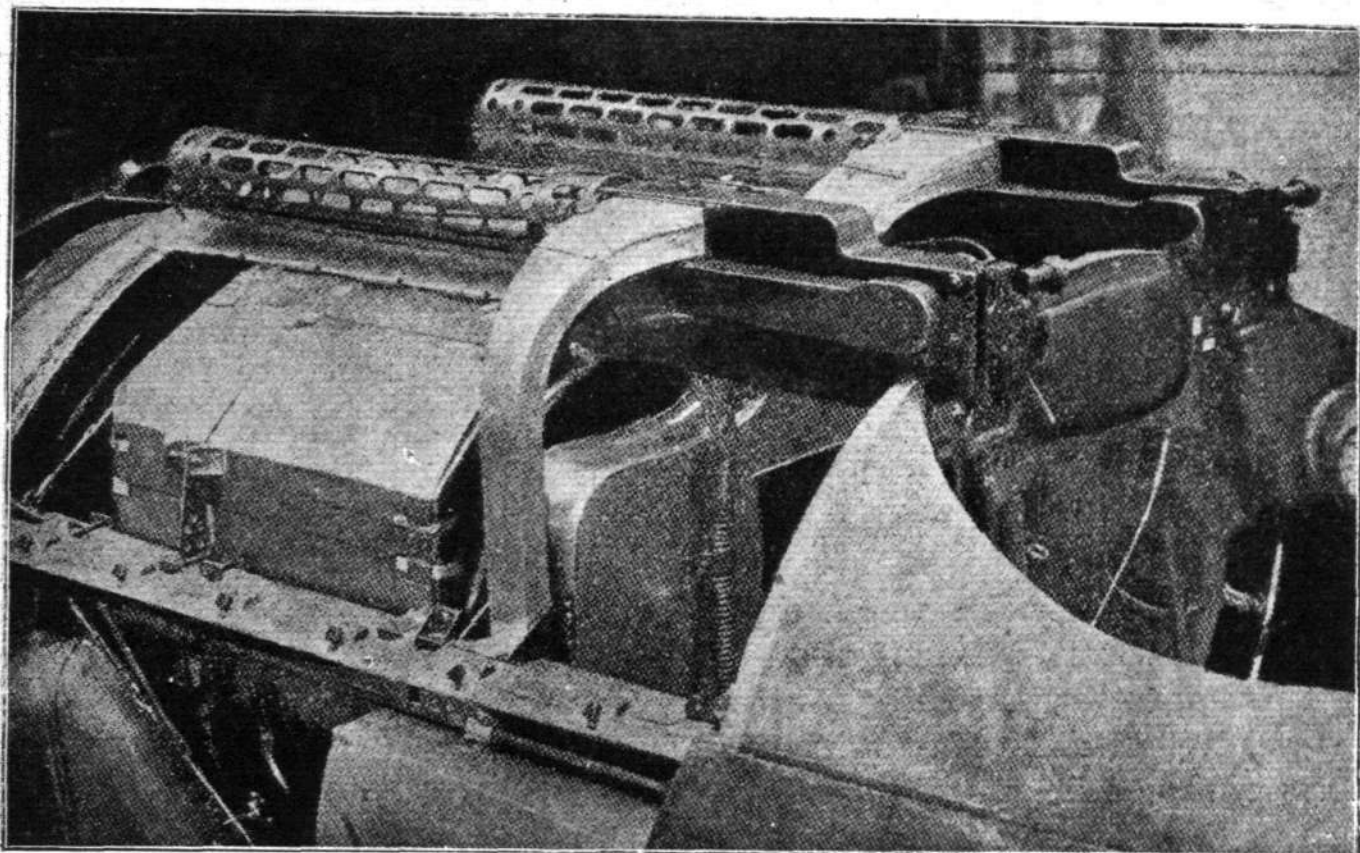
THE SIEMENS SINGLE-SEATER.—Three-quarter front view.



THE SIEMENS SINGLE-SEATER.—View of the Pilot's cockpit.



THE SIEMENS SINGLE-SEATER.—Engine mounting.



THE SIEMENS SINGLE-SEATER.—Machine gun mounting.

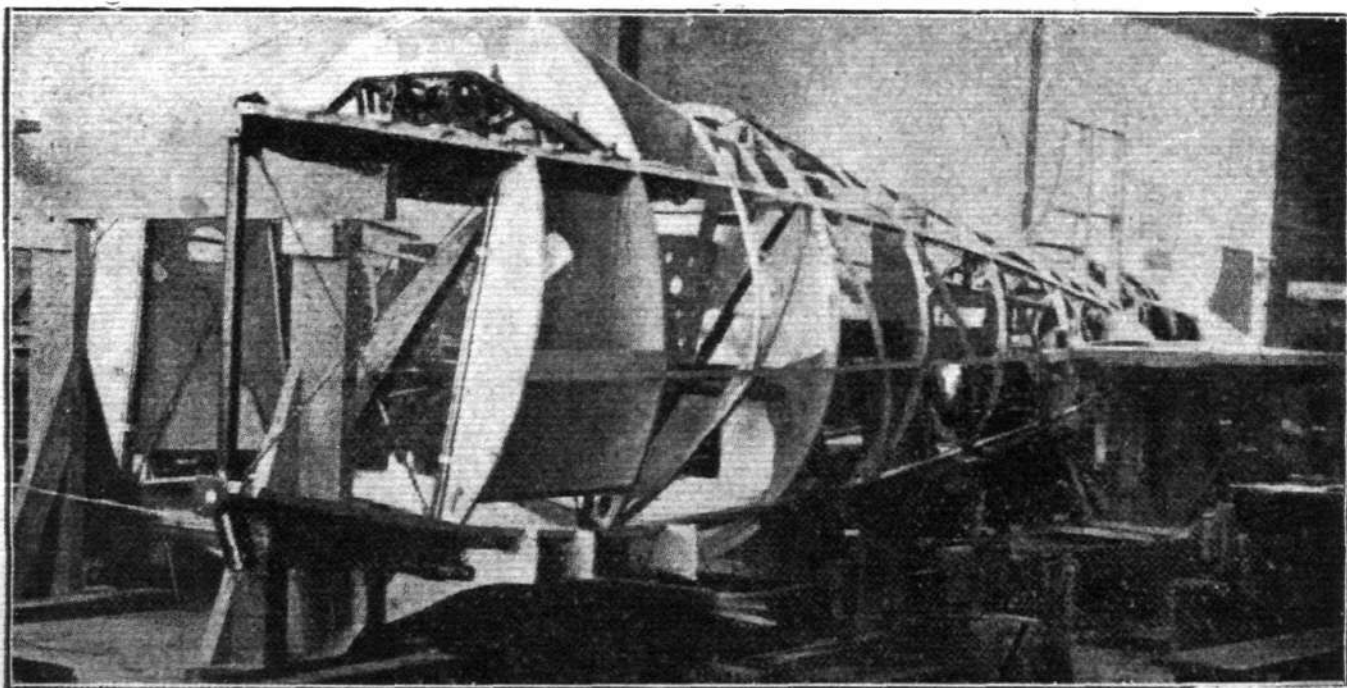
fabric is stitched to the ribs. All the wing spar fittings are so designed as to surround the spars, thus avoiding piercing. There are four *ailerons* of the balanced type, which are hinged to the rear spar. The *ailerons* are operated by steel tubes lying inside the plane, an arrangement which in addition to the advantage already referred to of safety against bullets, gives less head resistance than cables placed on the outside of the wing. (This is evidently a "crib" of the Nieuport type of control.—Editor FLIGHT.) The inter-plane struts are in the form of Vees, which have their pointed end secured to a bridge piece of wood between the lower plane spars. Both front and rear struts of the Vee are of streamline section, and are hollowed out for lightness. The canopy (Baldachin) or centre section struts are braced by cables in such a manner that, by utilising the machine-gun bridge in the construction, they do not interfere with the sighting and use of the guns. The main wing bracing consists of two cables with a very high factor of safety, while an external drift wire to the nose of

the body is provided to afford extra safety during a long steep dive.

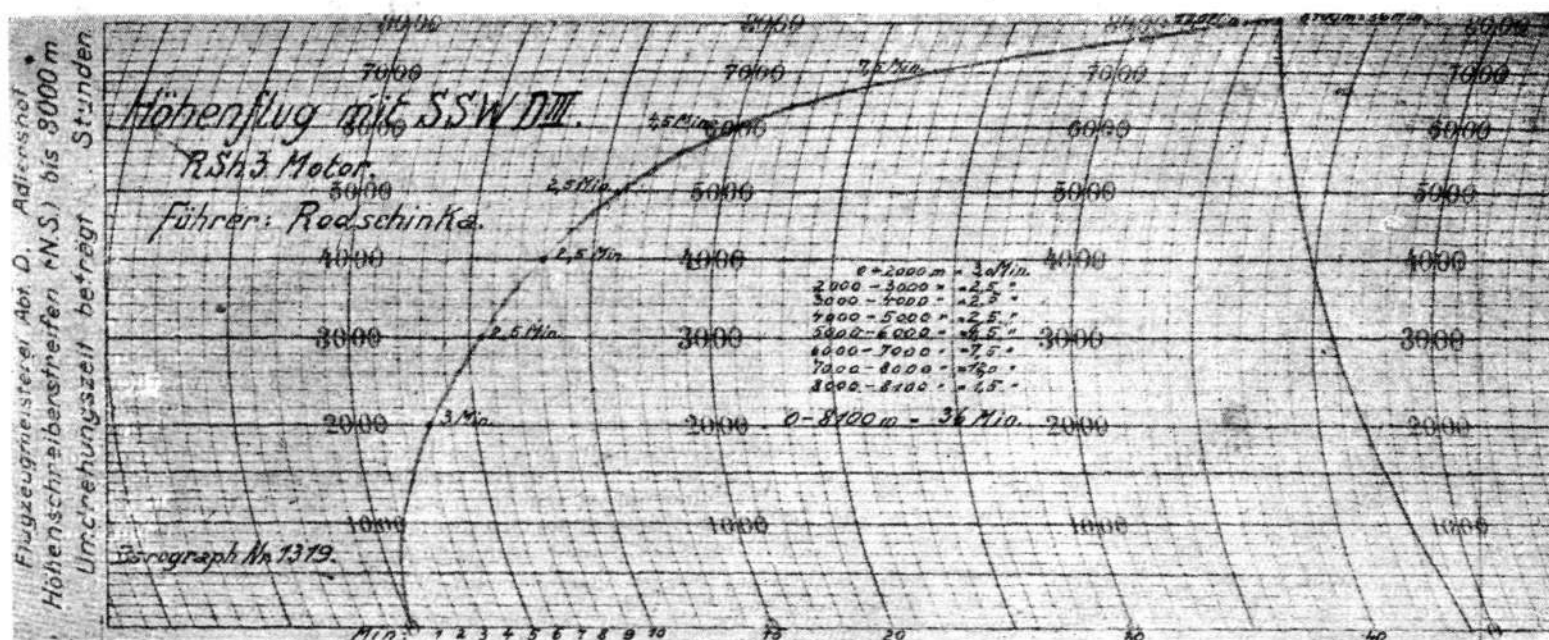
The armament consists of two machine-guns, rigidly mounted, and synchronised to fire through the propeller. Adjustment of the guns is made at the rear support.

Sand tests carried out on the machine have given results far above the official specifications. During the most severe tests in the air, including dives and upside-down flights, no defects were found, and not a single part had taken a permanent set or stretch after the very severe test flights.

One of the accompanying illustrations shows a barograph record taken under official tests and with the machine carrying its service load of 195 kg. The climbs are only to be described as exceptionally good, and have not, so far as is known, been equalled by our enemies. (This is not correct.—Editor FLIGHT.) The speed and manoeuvrability has drawn favourable comment from all quarters, and the machine has become a leading weapon in the hands of our skilful pilots. The



View of the body construction of the Siemens Single-Seater.



Photograph of a Barograph record of the climb of a Siemens Single-Seater. The first 2,000 metres were climbed in 3 mins.; 2,000 to 3,000 in 2.5 mins.; 3,000 to 4,000 in 2.5 mins.; 4,000 to 5,000 in 2.5 mins.; 5,000 to 6,000 in 4.5 mins.; 6,000 to 7,000 in 7.5 mins.; 7,000 to 8,000 in 12 mins.; and 8,000 to 8,100 in 1.5 mins. Total, 8,100 metres in 36 mins.

Armistice has prevented the machine from appearing in quantities on the front. The enemy Press had already learned of the appearance of this machine, and we find in the *Matin*, during August, an article dealing with it, and English technical

journals conclude a description of the Siemens by challenging the English industry to overtake, by intensive work, the lead which the German industry has gained with this machine and motor.

The R.A.F. of Occupation

In the list of units and formations, including those on the lines of communication, comprised in the Army of the Rhine, issued by the War Office on March 7, the following appears:—

Royal Air Force

Headquarters, 1; Brigade Headquarters, 2; Wing Headquarters, 6; Squadrons, 32 and 1 Flight; Balloon Wing H.Q., 1; Balloon Coys. H.Q., 5; Balloon Sections, 12; Aircraft Parks, 3; Reserve Lorry Parks, 9; Air Ammunition Columns, 3; Aerodrome Service Unit H.Q., 1; Tent Detachments, 10; Aerodrome Construction Company, 1; Maintenance Parties, 14; Agricultural Party, 1; Aircraft Depot H.Q., 1; Store Units, 4; Accounting Sub-Sections, 4; M.T. Repair Sections, 4; Port Depot, 1; Balloon Gas Dump Section, 1; Hydrogen Tube Dump Parties, 1; Aeroplane Supply Depot H.Q., 1; Salvage Sections, 4; Emergency Landing Ground Parties, 5; Engine Repair Shops, H.Q. and 4.

Air Council to Control Air Navigation

THE Air Ministry has issued the following announcement:—

The statement which has recently appeared in the Press as to a difference between the Air Ministry and the Ministry of Communications with reference to the control of civil aviation is without foundation.

Under the terms of the Air Navigation Act, 1919, the purposes of the Air Council have been extended to include all matters connected with air navigation.

Calcium Carbide Free

THE Minister of Munitions announces that the Calcium Carbide Order of September, 1917, is suspended. Until further orders, therefore, it will be permissible for traders to deal freely in calcium carbide without a permit from the Ministry.

Controller of Surplus Aircraft Equipment

MR. W. McC. CAMERON, till recently Deputy Controller of Aircraft Supply and Production, has been appointed Controller of Aircraft Equipment under the Surplus Government Property Disposal Board of the Ministry of Munitions.

Aeroplanes and Engines Sale

THOSE who are requiring either aeroplanes or aero engines may be able to find something to suit them in a batch of surplus Government property which is now being offered for sale by tender. The items include 650 aero engines of various makes and sizes and 150 new aeroplanes minus engines. Particulars can be had from the Aircraft Disposal Department, York House, Kingsway, W.C.2.

Proposed Passenger Services

ALTOGETHER six companies have approached the Dover

Town Council for facilities for aircraft services, including trips to London and pleasure tours. The Corporation will do what it can to assist such ventures, but the companies themselves must select the sites for their hangars, etc.

The Broadstairs Council has refused to grant facilities on the sands for flying trips.

Having received a request from Messrs. Dawson and Co., of Newcastle-on-Tyne, for facilities for landing off-shore to pick-up and put down passengers in connection with an aerial service connecting South Coast resorts, the Teignmouth Council has asked for a representative of the company to attend before the Council.

No Newspapers by Official Aerial Mail

It is announced by the Air Ministry that "the statements which have appeared in certain newspapers that arrangements had been made for the conveyance of these journals from England to the Western Front by the official aeroplane mail service are incorrect. The service is being entirely utilised for the carriage of mails for the troops."

To Connect Australian State Capitals

A COMPANY is being formed in Melbourne for the purchase of 25 aeroplanes, it being the intention to establish a commercial service between the State capitals of Australia, including Hobart (Tasmania), reports *The Times* correspondent in Sydney. The cost of the enterprise is estimated at £500,000.

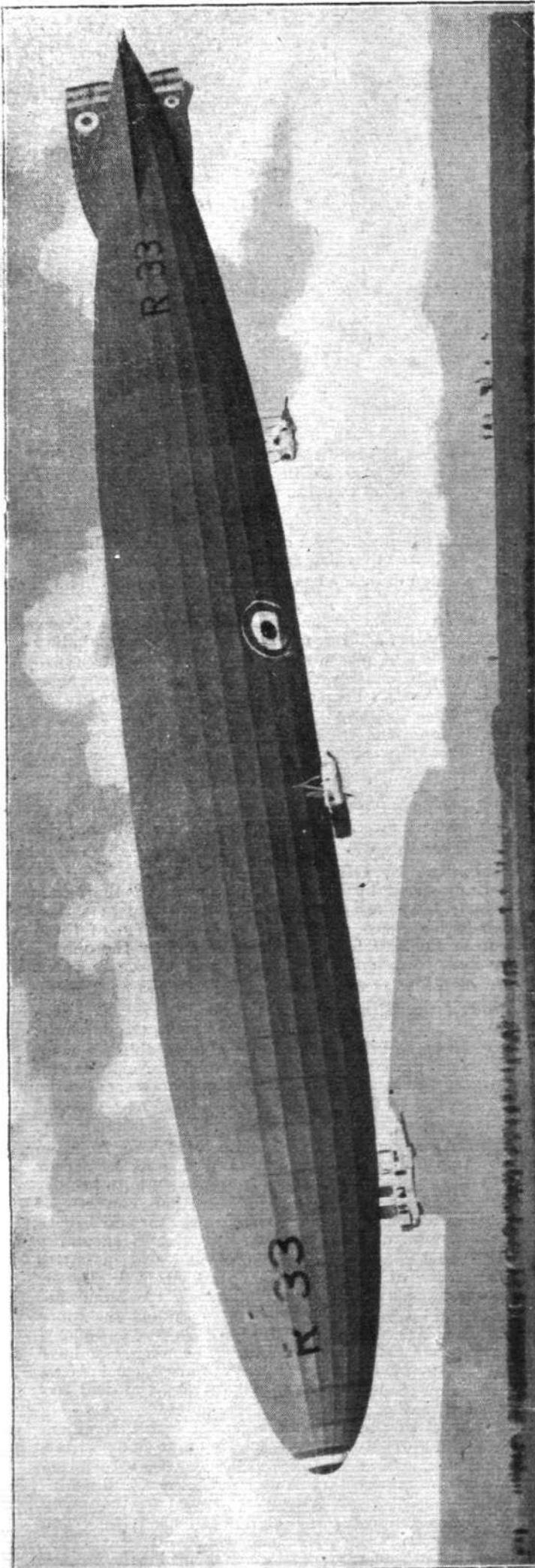
Aerial Insurance

OFFICIAL particulars are to hand of "The Aviation Insurance Association," which has been formed to accept at home and abroad all risks in connection with both heavier and lighter-than-air craft. The Association consists of Underwriting Members of Lloyds, the Eagle, Star and British Dominions Insurance Co., Ltd., and the Excess Insurance Co., Ltd. The business will be controlled by a committee of five, consisting of Messrs. W. C. Campbell, J. E. Duder, and George Simmons, all of Lloyds; Sir Edward M. Mountain, chairman of the Eagle, Star and British Dominions Insurance Co., Ltd., and Mr. Cuthbert E. Heath, of Lloyds, and chairman of the Excess Insurance Co., Ltd. The committee have appointed as manager, Mr. Horatio Barber, A.F.Ae.S., F.R.G.S., and offices have been opened at No. 1, Royal Exchange Avenue, E.C.

The formation of the Association is the result of an increasing demand for aviation insurance, and underwriters consider that this will be best served by a strong association having the resources necessary to create an expert and world-wide organisation. No effort will be spared in producing forms of policies and rates of premiums to meet trade and other requirements.

A preliminary prospectus and proposal forms for the various risks undertaken will be forwarded upon request.

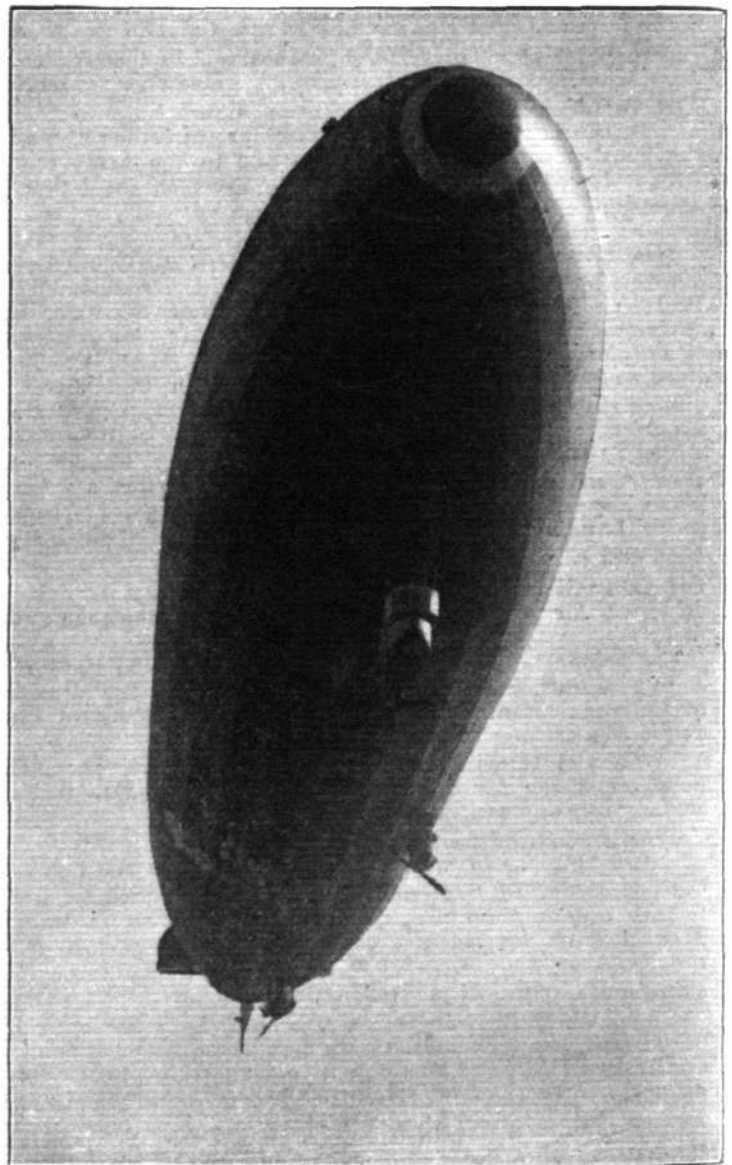
THE R 33—AND SOME REFLECTIONS



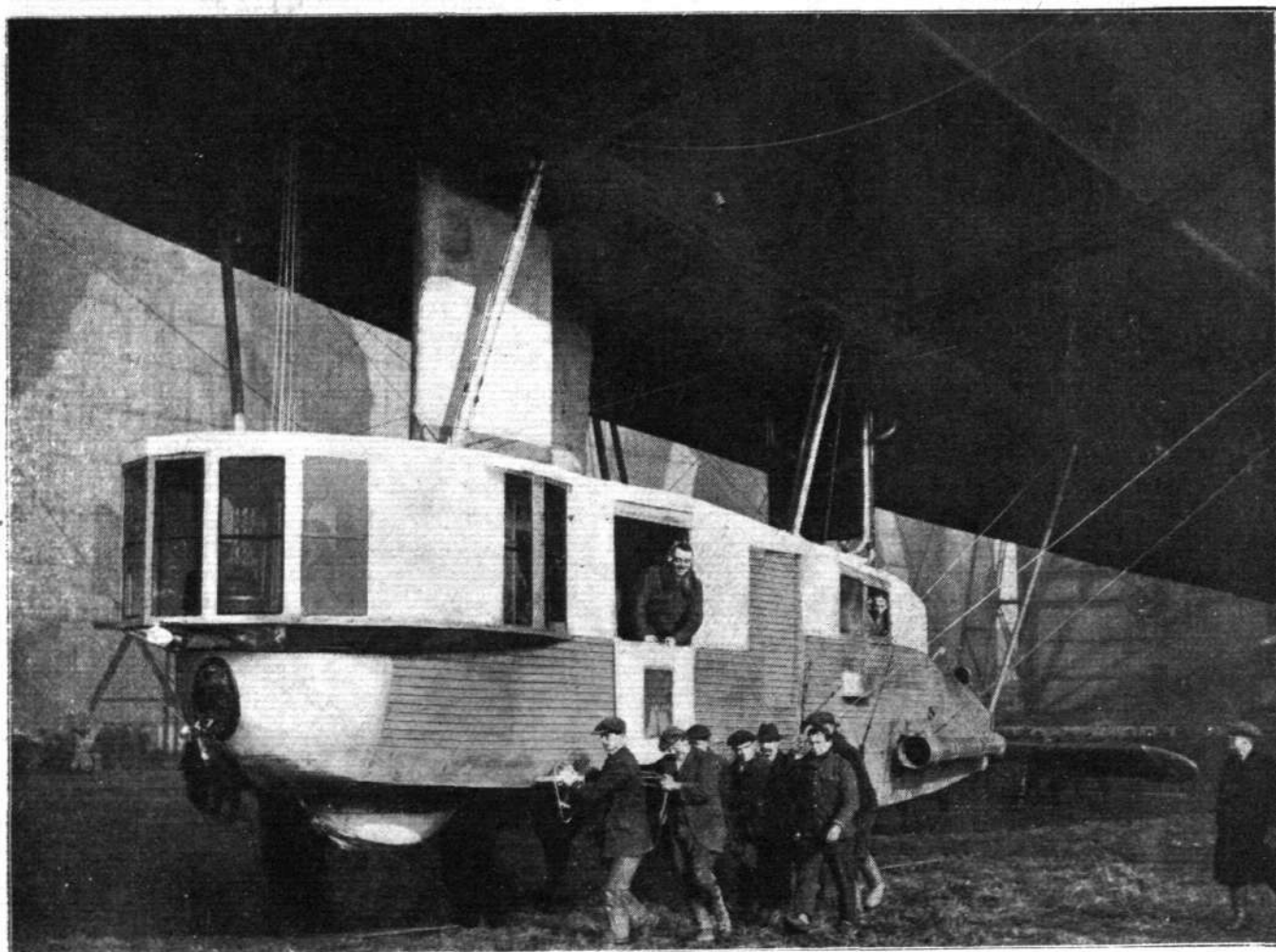
ONE OF OUR LATEST AIRSHIPS.—The R 33 makes a trial cruise at Selby, Yorks. Note the stream-line shape of the hull.

AFTER being shrouded in mystery for the last four years or so, our airships and all relating to them are gradually coming into the limelight. The result has, not unnaturally, been that the lay press has got hold of airships, and, without a thorough knowledge of the history and science of the subject, has been somewhat prone to overestimate the results actually achieved, while at times taking an optimistic view of the future, not invariably justified by facts. Thus, in the case of our latest rigid, the R. 33, there has been a tendency to regard this airship as the commercial airship of the future, and to take it for granted that she is capable of doing the return journey across the Atlantic almost at any time, being, in fact, merely waiting for suitable weather before making the journey. Much has also been made of the fact—if it be a fact—that this is the greatest airship in the world. We would be the last to underrate the excellent work done by our airship people, and have nothing but praise for the manner in which they have tackled a difficult problem, but it does appear to us that if the brake is not put on, so to speak, there is a danger that, through ill-considered optimism in regard to the airship question, the general public may be led to anticipations that are doomed to disappointment, which would do infinite harm to the future of commercial aviation. It may, therefore, not be out of place if we try to regard quite dispassionately the question of the transatlantic voyage, and other matters connected with the rigid type of airship.

To review the various points in the order in which they have been referred to: The R. 33 was designed as a naval



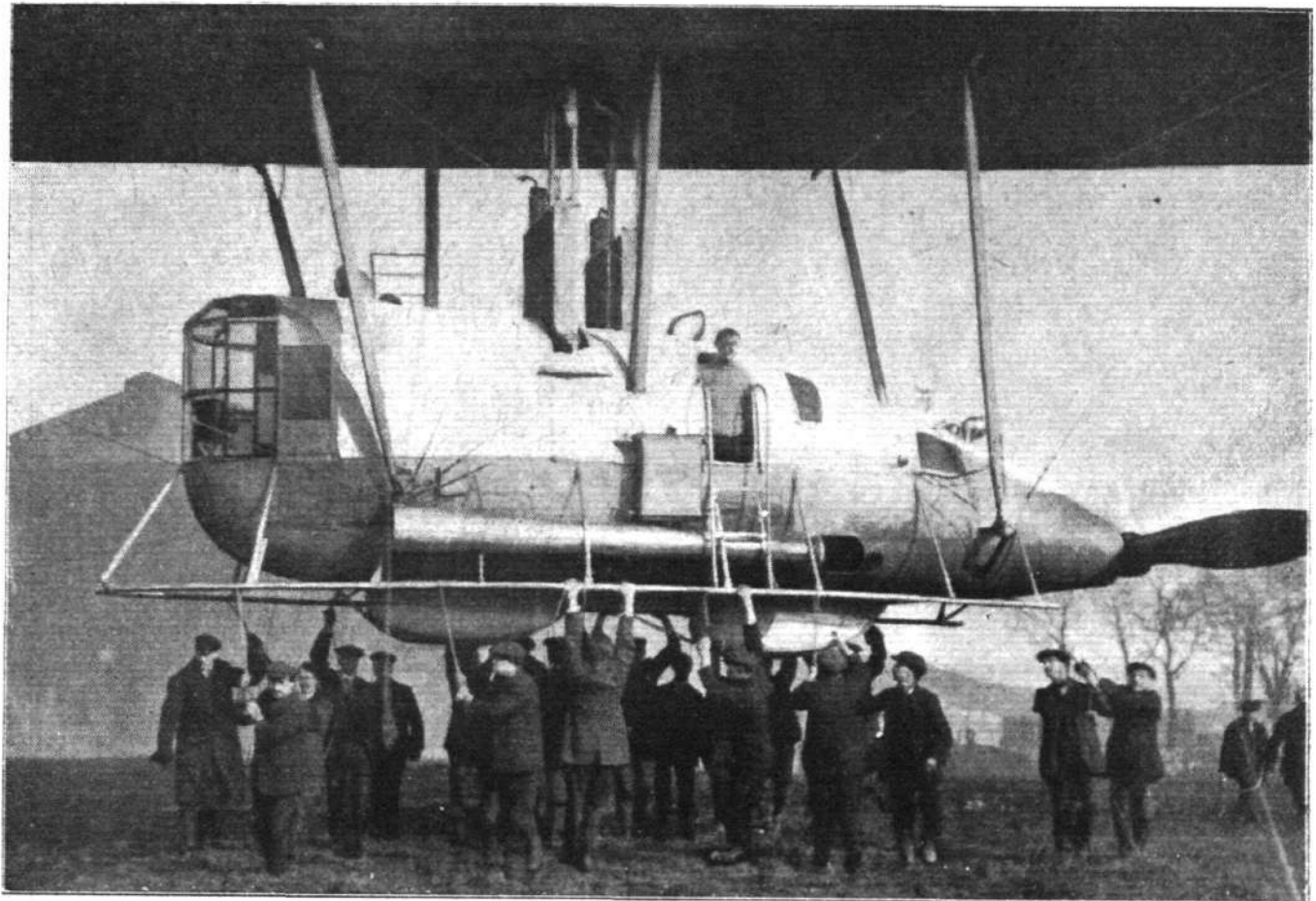
THE R 33.—View from underneath. This illustration gives a good idea of the arrangement of the engine cars. The commander's cabin is slung centrally in front. Then, about halfway along the hull, there are two engine cars suspended under the sides of the airship. Finally, another engine car is centrally slung at the rear. It will be noticed that there is no outside keel on the R 33.



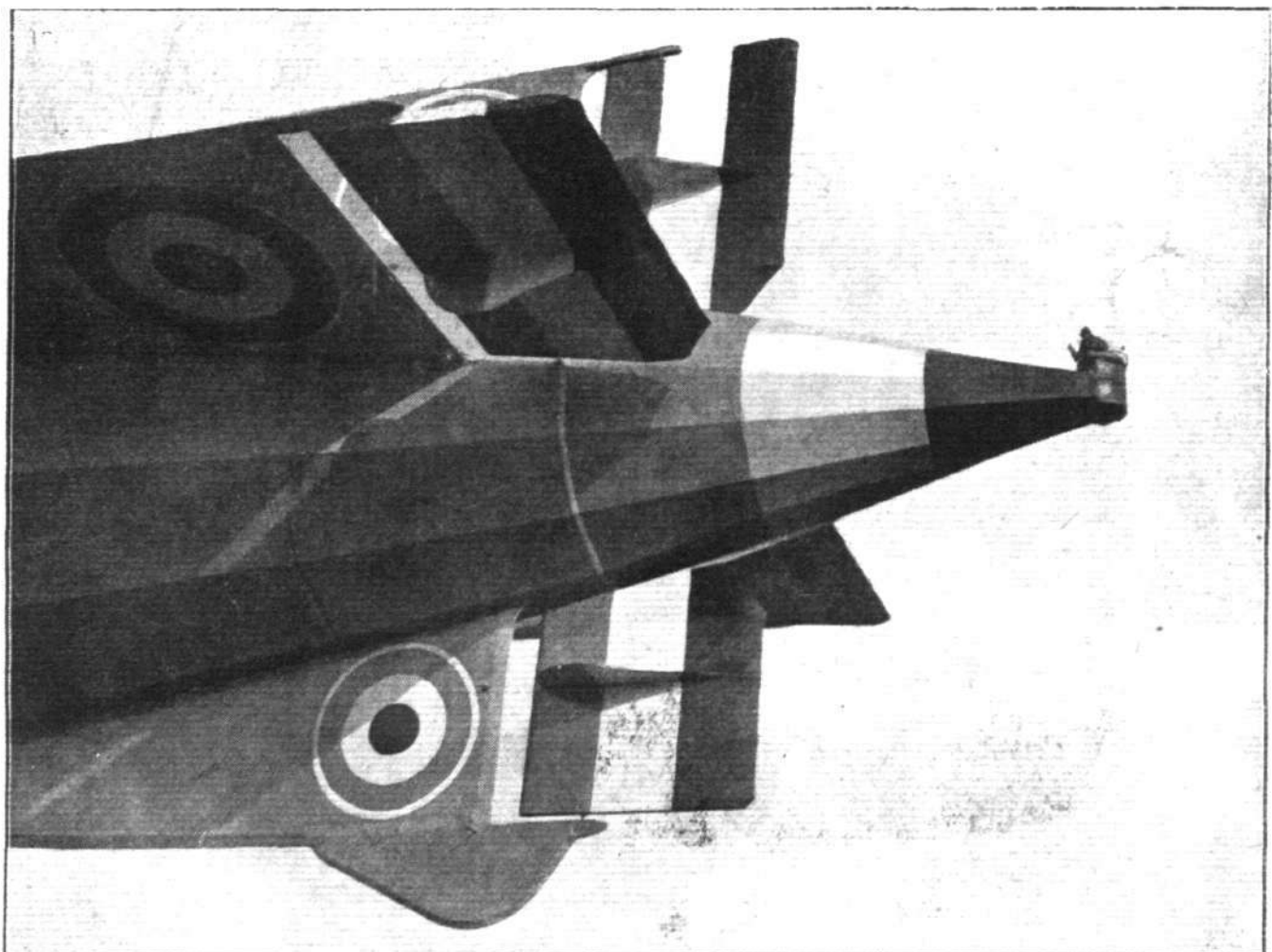
THE R 33.—The front car, with navigation cabin and wireless room.



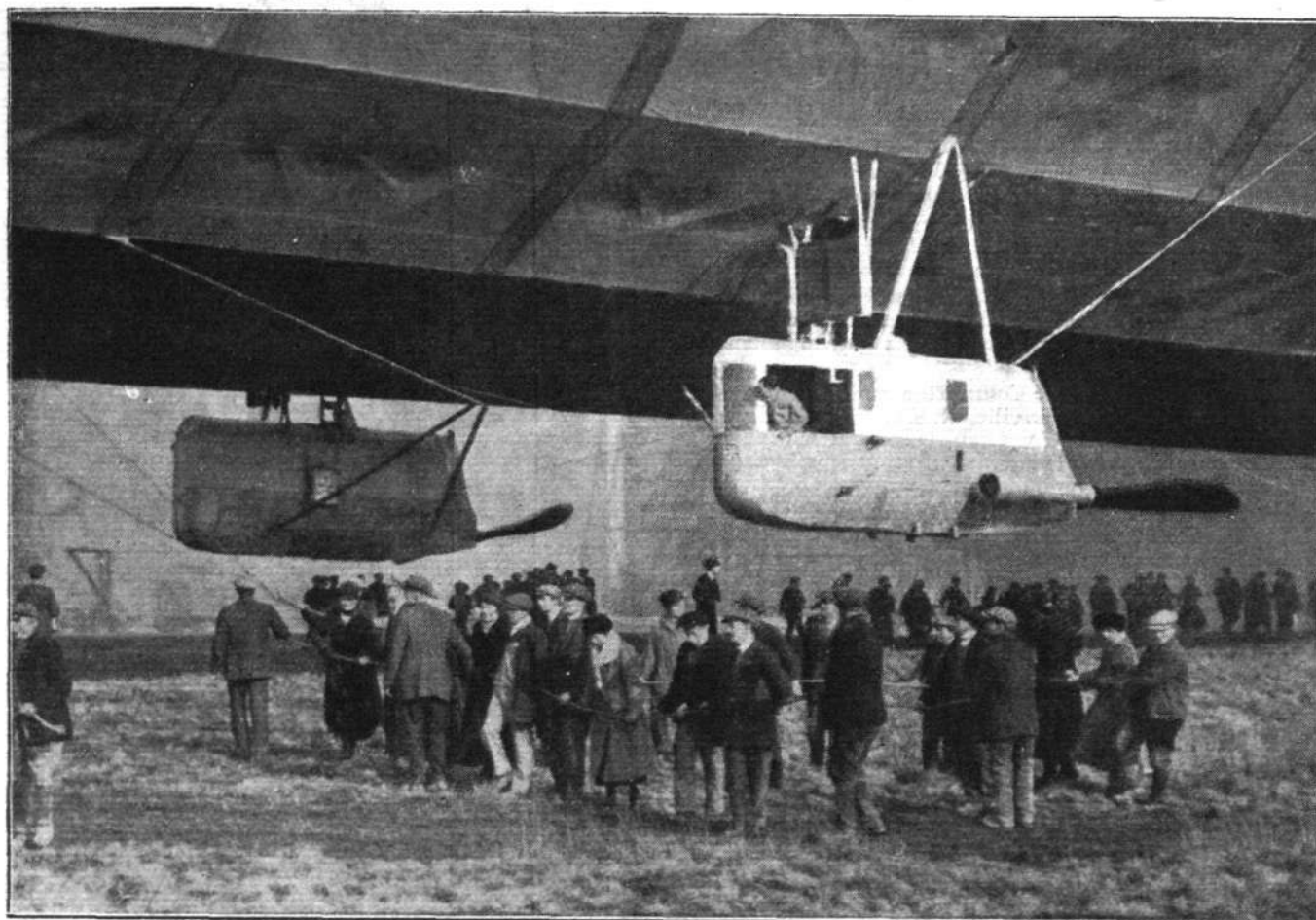
THE R 33.—A near-up view of one of the central engine cars.



THE R 33.—The rear engine car.



THE R 33.—View of the tail planes. Note the gunner's nest in the extreme stern.



The two central engine cars of the R 33.

scout, and although modifications may be made which will enable her to carry a small number of passengers or a quantity of mails, she can hardly be expected to compete with an airship originally designed for commercial work. Not, of course, that this fact detracts from the merits of the R. 33—for the purpose for which she was designed. There can be little doubt that, apart from such experience gained with this ship as is of immediate usefulness from the naval point of view, much will be learned which will be of the greatest value in the designing of the purely commercial airship of the future. Thus the general structural design of the two types need not vary greatly, although details may differ, and the disposition of cars, etc., be modified. Also general questions of performance should apply to a great extent to both the commercial and the naval type. There is thus good cause to be satisfied with the production of the R. 33, although it should be kept in mind that her value—from the commercial aviation point of view, of course, and not from the military—is to be considered of an indirect nature, and the ship herself should not be regarded as a solution of the problem of the commercial airship.

As regards the trans-Atlantic trip, the prevailing idea appears to be that the R. 33 could do the return journey with ease, given favourable weather conditions. The volume of the R. 33 is in the neighbourhood of 2,000,000 cu. ft. Assuming that 1,000 cu. ft. of hydrogen will lift about 70 lbs., which is a fair estimate, the gross lift will be about 62.5 tons. The weight of the airship will probably be in the neighbourhood of 30 tons, say 28 tons. This leaves a disposable lift of 34.5 tons. The weight of crew, ballast, etc., may be taken as about 11 tons. Taking the average cruising speed as 40 knots (46 m.p.h., which is not, of course, the maximum speed) and the distance to New York as 3,000 miles, following the southern route, the time for the double journey will be 130 hours. Taking the horse-power at the cruising speed as 1,000 h.p., and the petrol and oil consumption as .5 and .03 lbs./h.p./hour respectively, the amount of fuel carried for the double journey will have to be about 30 tons. As the tank capacity of the R. 33 is stated to be about 20 tons, it will be seen that very favourable weather would have to be counted upon to make the journey possible, even if the return journey is made along the direct route. There is, however, no reason why she should necessarily do the journey without taking in fuel on the other side, and as the single journey may be assumed to consume about 15 tons of fuel, there is a reserve of 5 tons, which should be ample for the purpose. There is no doubt that a small fleet of these airships could—and in our opinion ought to—do a great amount of very useful meteorological work by exploring the upper air over the Atlantic Ocean during the coming spring and

summer, thus providing information which would be of the utmost value when the commercial airship service across the Atlantic comes into being as it surely will—some day.

With reference to the question of whether or not the R. 33 is, as has been claimed in some newspapers, the largest airship in the world to have flown, it will be found that in our detailed description of the L. 33, published in the October 27, 1916, issue of *FLIGHT*, the length of the L. 33 was estimated by our representatives to be 680 ft. with a diameter of 75 ft. These figures may be taken as being fairly accurate, although they cannot be guaranteed as the airship was in a damaged condition. The R. 33 is stated to be 670 ft. long and to have a diameter of 79 ft. The difference in size is not, therefore, considerable, and the cubic capacity of the two airships is probably so nearly the same as to make no difference. There is little doubt that some of the more recent German airships—the L. 33 dates from 1916, it should be remembered—is of greater volume than this, while we believe we are correct in stating that the capacity of the R. 36 class of ship is considerably over 2,000,000 cu. ft., and that these airships have already flown.

While on the subject of the L. 33, it may be of interest to refer briefly to the similarity between the British and German "33's." The stream-line shape, as different from the type having parallel sides and tapered nose and stern, is similar in the two airships. So also is the general shape and arrangement of the fins, rudders, and elevators. The same may be said of the number and disposition of the cars: One in front, two side by side about half-way aft, and one at the rear. The shape of the cars of the R. 33 is considerably different from those in the L. 33, while the disposition of the airscrews differs greatly. Thus in the L. 33, it may be remembered, although there were only four cars, there were six airscrews, two of which were mounted on a framework on the sides of the hull and driven through shaft and bevel gearing. In the R. 33 these screws have been done away with, as was also the case in German airships of later date than the L. 33. In the R. 33, there are six Sunbeam-Coatalen engines of the Maori type driving four propellers. Apart from detail design, these are the chief differences between the L. 33 of 1916 and R. 33 of 1919. As regards the fundamental principle of construction, there is considerable similarity between the two types.

Although the trial cruise of the R. 33 on March 6th was cut short, after three hours, by adverse weather, the tests indicated that the ship is very promising, and further trials will be watched with interest by all students of aircraft. Col. Hicks was the trial flight pilot, with Major Thomas as captain of the ship.

THE ROYAL AERO CLUB OF THE U.K.

OFFICIAL NOTICES TO MEMBERS.

ANNUAL GENERAL MEETING

The Annual General Meeting of the Members of the Royal Aero Club of the United Kingdom will be held on Monday, March 31, 1919, at 3, Clifford Street, New Bond Street, London, W. 1, at 6 p.m.

Committee

In accordance with the rules, the Committee shall consist of eighteen members. Members are elected to serve for two years, half the Committee retiring annually. Retiring members are eligible for re-election.

The retiring members of the Committee are:—

Lieut.-Col. John D. Dunville, R.A.F.
Lieut.-Col. Spenser D. A. Grey, D.S.O., R.A.F.
Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S.
Lieut.-Col. A. M. Longmore, R.A.F.
Lieut.-Col. F. K. McClean.
Brig.-Gen. E. M. Maitland, D.S.O., R.A.F.
The Right Hon. Lord Northcliffe.
Lieut.-Col. Alec Ogilvie, R.A.F.
Maj.-Gen. Sir Godfrey M. Paine, K.C.B., M.V.O.

Any two members of the Club can nominate a member to serve on the Committee, provided the consent of the member has been previously obtained. The name of the member thus nominated, with the names of his proposer and seconder, must be sent in writing to the Secretary not less than fourteen days before the Annual General Meeting. The last day for the receipt of nominations is Monday, March 17, 1919.

SPECIAL COMMITTEE MEETING.

A SPECIAL MEETING of The Committee was held on Tuesday, the 4th inst., when there were present:—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Major-General W. S. Brancker, R.F.A., Mr. Ernest C. Bucknall, Mr. G. B. Cockburn, Lieut.-Col. John D. Dunville, R.A.F., Lieut.-Col. F. K. McClean, Lieut.-Col. J. T. C. Moore-Brabazon M.P., Lieut.-Col. Alec Ogilvie, R.A.F., and H. E. Perrin, Secretary.

Election of Members.—The following New Members were elected:—

Capt. Francis Lawrence Atkinson, R.A.F.
Major William George Barker, V.C., D.S.O., M.C., R.A.F.
Major Frank Arnold Bumpus, R.A.F.

Lieut. James Stuart Castle, R.A.F.
Capt. Grahame George Dawson, R.A.F.
Lieut. Victor William Hugh Hillyard, R.A.F.
Major Robert Hobart Mayo, R.A.F.
Lieut. Robert Withy Peel, R.A.F.
Lieut. Thomas Anthony Scattergood, R.A.S.C.
Lieut.-Col. Ernest Walter Stedman, R.A.F.

THE FLYING SERVICES FUND

(Registered under the War Charities Act, 1916)

Administered by the Royal Aero Club

For the benefit of Officers, Non-Commissioned Officers and Men of the ROYAL AIR FORCE who are incapacitated while on duty, and for the widows and dependants of those who are killed or die from injuries or illness contracted while on duty.

Honorary Treasurer:

The Right Hon. LORD KINNAIRD.

Committee:

Lieut.-Col. T. O'B. HUBBARD, M.C., R.A.F. (Chairman).
Mr. CHESTER FOX.
Lieut.-Col. C. E. MAUDE, R.A.F.
Brig.-Gen. R. H. MORE, C.M.G., R.A.F.

Secretary:

H. E. PERRIN

Bankers:

Messrs. BARCLAYS BANK, LTD., 4, Pall Mall East, London, S.W. 1.

Subscriptions

	£	s.	d.
Total subscriptions received to March 4, 1919..	14,900	0	11
Engine Repair Section, No. 2 (Northern)			
Aircraft Repair Depot, Royal Air Force,			
Greenhill, Sheffield	19	19	6

Total, March 11, 1919 14,920 0 5

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

ROLL OF HONOUR.

Published March 6.

Killed

Green, Sec. Lieut. S. Payne, Capt. L. A., M.C.

Died

Cowan, Lieut. G. H., Aust. F.C. Sydes, Lieut. W. J. A.
Jenkins, Lieut.-Col. E. O. Underhill, Sec. Lieut. R. J.
Moore, Sec. Lieut. W. H. Waterhouse, Lieut. J.
Stanley, Capt. R. B.

Published March 8.

Killed

Preece, Lieut. C. E.

Drowned

Smith, Lieut. W.

Died

Banks, Sec. Lieut. P. A., M.C. Holder, Lieut. E.
Christie, Lieut. D. M. Kemp, Lieut. S. A.
Fullerton, Sec. Lieut. R. R. McLeod, Lieut. G. D.

Published March 10.

Killed

Coffing, Sec. Lieut. G. L.

Jeicoate, Capt. F.

Died

Brown, Lieut. J. H. Michaelson, Lieut. R. G.
Foster, Lieut. W. A. Osborn, Sec. Lieut. J. E.
Haggerston, Maj. T. Wallis, Sec. Lieut. F.

REPATRIATED.

The following R.F.C. officers who were prisoners of war in Germany, have been released and have arrived in England. Where an officer was seconded, h = original unit is indicated in brackets:—

Published February 19.

Baker, Capt. R. P. (B.C.R.). McLean, Lieut. W. A.
Mapplebeck, Capt. T. G. (King's Pocock, Lieut. A. D.
L'pool R.).

Published February 26

The following officers of the R.A.F. have been repatriated:—
Blake, Lieut. J. W. Lewis, Lieut. A. D. M.
Carroll, Lieut. C. E. Main, Lieut. R.
Copley, Lieut. A. Moxon, Sec. Lieut. N. F.
Leifroy, Lieut. C. B. H. Simpson, Lieut. J. W.
Leslie-Moore, Lieut. A.

Published March 3

The following officers are reported repatriated:—

Aked, Lieut. H. L. C. Strover, Capt. E. J.
Eberli, Capt. F. H. Talbot, Sec. Lieut. F. W.
Hibbard, Capt. S. R. Sugden-Wilson, Capt. W. H.

Published March 6.

Brown, Lieut. W. A. S. Fosse, Lieut. E. L.
Cooper, Capt. E. J. Snook, Capt. C.

Correction.—Crichton, Sec. Lieut. A. C. (reported repatriated) should read: Crichton, Sec. Lieut. C. A.

A Chinese Scheme

A DELAYED message from *The Times* correspondent at Peking, dated February 25, states that the Ministry of Communications has signed a contract with a Peking Syndicate for the supply of six Handley-Page aeroplanes to inaugurate a Chinese mercantile air service. The machines are to be capable of flying 100 miles an hour and to carry 20 passengers, or an equivalent cargo. The contract does not involve the raising of a loan.

Commercial Aviation in Canada

THE Dominion Government has decided to appoint an Aerial Board to consider the possibilities of commercial flying in Canada. Dr. Thompson, member for the Yukon, who will be on the Board, has advocated a regular aeroplane service between Dawson City and Edmonton, and the use

of aeroplanes to explore the vast country between Hudson Bay and Alaska.

Long-Distance Flying in Italy

AN Italian military aeroplane has flown from Milan to Otranto, a distance of 687½ miles, in 5 hr. 5 min., in unfavourable weather.

Aerial Insurance

Now that the question of insurance of machines, passengers, pilots, goods, etc., is so very much to the fore, we shall be pleased to receive enquiries from companies or individuals interested in the subject, with a view to arranging rates, etc., under Lloyd's policies. Enquiries should be addressed to F. King, Manager, Aerial Insurance Department, 36, Great Queen Street, Kingsway, W.C. 2, who is in a position to quote the lowest market rates.

SOME POINTS IN AEROPLANE DESIGN

BY F. S. BARNWELL, CAPTAIN, R.A.F.

(Concluded from page 313)

PLATE IX.—Next comes a rather limited investigation of the controlling power of *ailerons*, or wing flaps. I have worked directly from figures given by the N.P.L. from experiments on a model aerofoil of 18 ins. span by 3 ins. chord, at a wind speed of 40 f.p.s., with flap extending for its whole length. Unfortunately the moment of the model flap about its hinge is so small that the percentage of experimental error is sure to be high.

The investigation is for two breadths of flap, Case I (narrow flap) with flap .22 of aerofoil chord, Case II (wide flap) with flap .385 of aerofoil chord.

The method adopted is as follows:—For both cases I have taken that the length of leverage on the flaps for the control cables (*i.e.*, A D and A E in the figures) is constant and equal to .0733 of the aerofoil chord. For both cases I have assumed that the length of the pilot's control pillar (H K in the figure) is constant and equal to .4 of the aerofoil chord; that the maximum lateral angular movement of this control pillar is 15 degrees on each side of the vertical, and that the maximum applied lateral force (at K) is 50 lbs.

For both cases I have assumed that the cable attachment lug, J J, may be adjusted to such vertical position on the control pillar as is required to give the specified maximum up and down range of flap movement, $-a$ and $+a$ in figure.

I have assumed that all bearings are frictionless. I have made out, for each case, two tables of "Flap Values," one table with aerofoil at 0 degrees incidence and one with it at $+12$ degrees incidence; only one is reproduced here—that for the wide flap, with incidence of $+12$ degrees for aerofoil. In the first column is given angular setting of flap, zero being, of course, when it forms the normal tail end of the aerofoil section.

In the second column is given value of "absolute" lift coefficient for whole aerofoil with flap. In the third column is given value of *added* lift coefficient, obtained by subtracting the lift coefficient for zero flap angle from all the lift coefficient values. In the fourth column is given the value of M, the moment in foot/lbs. of the wind force on the flap about its hinge. In the fifth column is given the added lift in lbs. on the whole aerofoil with flap, obtained by multiplying the added lift coefficient by 1.422. In the sixth column is given the value for t , the tension in the control wire (D G or E F), obtained by multiplying M by 54.5; it should be noted that if t be positive then wire E F is in tension, whilst if t be negative then wire D G is in tension. In the seventh column is given the value of t divided by t , which is a measure of difference in lift on the whole aerofoil corresponding to a certain tension in the control wire. It is notable that if a system were possible in which the flap on one side at a time of a machine could be pulled up, whilst the other flap remained in normal position, such system would give a very light control load on the pilot, for the flap has an upward wind load on it until it is at -10 degrees. It is also of note that, with the standard practice of interconnected double-acting flaps, up to a flap setting of $+10$ and -10 degrees, the rising flap helps to pull the other down, whilst beyond this range tension must be applied to pull the rising flap higher as well as to pull the falling flap lower.

In the eighth column is given the value of flap setting, a , for two aerofoils, one with flap down, the other with flap up. In the ninth column is given the value in lbs. of f , the sum of the value of the *added* lift in lbs. on the aerofoil with flap at $+a$, plus the value of the *decreased* lift in lbs. on the aerofoil with flap at $-a$; f is thus a measure in lbs. of the total up and down forces produced on both aerofoils together by a flap setting of $+a$ and $-a$. In the tenth column is given the value of p in lbs. where p is the actual pull which must be given to the control wires (irrespective of balanced tensions), to produce flap positions of $+a$ and $-a$; it is obtained by subtracting the values of t for $+a$ values from the values of t for the corresponding $-a$ values.

In the last column is given the value of f divided by p , which is a measure of flap "efficiency," as it is the ratio of the total up and down forces produced on the two aerofoils to the force which must be applied to the control wires in so doing. It is noticeable how this "efficiency" drops as the range of flap movement is increased, due to the fact that the wind reaction on the rising flap is an upward and decreasing load to -10 degrees, and then becomes a downward and increasing one.

Having obtained these four tables of "flap values," I have proceeded to apply them to a full-size machine.

I have considered a biplane of equal top and bottom wings of 6 ft. chord, with double-acting flaps of the same size on

top and bottom wings. I have taken that the speed when incidence of wings is zero is 160 f.p.s. (about 109 m.p.h.), and that the speed therefore when incidence of wings is $+12$ degrees is 72.2 f.p.s. (about 49 m.p.h.); I have assumed that the "absolute" lift coefficient values for the full-size biplane are the same as for the model monoplane.

I have employed the "standard" form of wing tip and have considered that the wings are uniformly loaded to within 1.9 ft. of their tips, as shown; I have also assumed that the up and down forces on uniformly loaded length of wing with flap, and the moment of uniformly loaded length of flap about its hinge, may be taken from the model figures (for an 18 in. span by 3 in. chord monoplane with flaps all along it) by direct substitution of areas and squares of speeds. On these assumptions we get the equations given here for our full-size biplane.

First we get an expression for the load which a lateral force of 50 lbs. at top of control pillar—*i.e.*, at K—will produce in the flap control wires for a required maximum value of up and down flap setting when the control lever is at 15 degrees to one side; this obviously varies inversely as the flap setting, and is of amount $\frac{4090}{a}$ in lbs., where a is the angular up and down flap setting in degrees. This load will produce a total sum of up and down forces on the wings of amount $\frac{4090}{a} \times \frac{f}{p}$, where $\frac{f}{p}$ is the "flap efficiency" value proper to flap setting of $+a$ and $-a$, and is taken from one of the tables of "flap values" for model.

We also obtain the result that if y be the length in feet of each of the four flaps, speed be 72.2 f.p.s. and incidence

$+12$ degrees, then $y = \frac{39.1}{p \times a}$, whilst if the speed be 160 f.p.s.,

and incidence 0 degrees, then $y = \frac{7.96}{p \times a}$, where p is the proper value for "resultant tension in control wire" taken from one of the tables of "flap values" for model.

The curves given here are for the full-size machine:—Curve P gives applied tension in flap control wires; Curve F_N gives resultant sum of up and down forces on the total uniformly loaded lengths of wing, with narrow flap; Curve F_w gives the same for broad flap; Curve L_N gives the required length in feet for each of four narrow flaps; Curve L_w the same for each of four broad flaps. All these curves are drawn on a base of value for maximum flap setting.

Now the controlling power is the rolling moment produced by the flap setting, and this is the product of the "sum of up and down forces" multiplied by leverage. I have taken the leverage as one-half of the distance between the centres of the uniformly loaded lengths of right-hand and left-hand flaps.

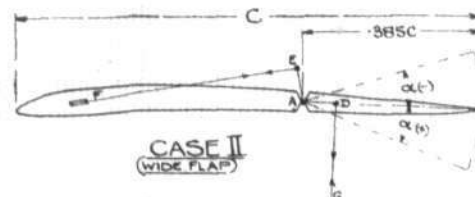
The top plans of two biplanes are shown here, a "short span" and a "long span." On these are drawn the flap sizes, both narrow and wide, which by a load of 50 lbs. applied at the top of the pilot's control column will, when the machine is flying at $+12$ degrees and at 72.2 f.p.s., be pulled respectively to ± 30 degrees, ± 20 degrees, ± 15 degrees, ± 10 degrees.

The leverages for rolling moment are obtained from these biplane plan views, and thence the values for rolling moment.

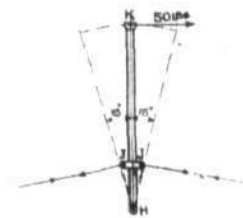
Curve RMNS 12 is rolling moment, in foot-lbs. for "short span" biplane with narrow flaps flying at $+12$ degrees incidence; Curve RMWS 12 is for same, but with wide flaps. Curve RMNL 12 is for "long span" biplane with narrow flaps, flying at $+12$ degrees incidence; Curve RMWL 12 is for same, but with wide flaps. Curve RMNLO is for the "long span" biplane with narrow flaps flying at 0 degrees incidence; Curve RMWLO is for same, but with wide flaps. On these last two curves are appended, in circles, the angle to which the flaps (which at $+12$ degrees incidence can be pulled up and down to the *abscissa* values for flap setting), can be pulled when the machine is flying at 0 degrees.

As a result of the methods we have applied we find that, except in the case of the "short span" biplane with narrow flaps, it would appear to pay to use flaps as long as possible. The most efficient flaps appear to be "C" narrow, or "J" wide, for the "short span" biplane, and "K" narrow, or "J" wide, for the "long span" biplane.

Of course, as I remarked before, there is the probability of a high percentage of experimental error in the flap moments, and neither friction nor inertia have been taken into account.



MAXIMUM UP & DOWN ANGULAR MOVEMENT OF FLAP.

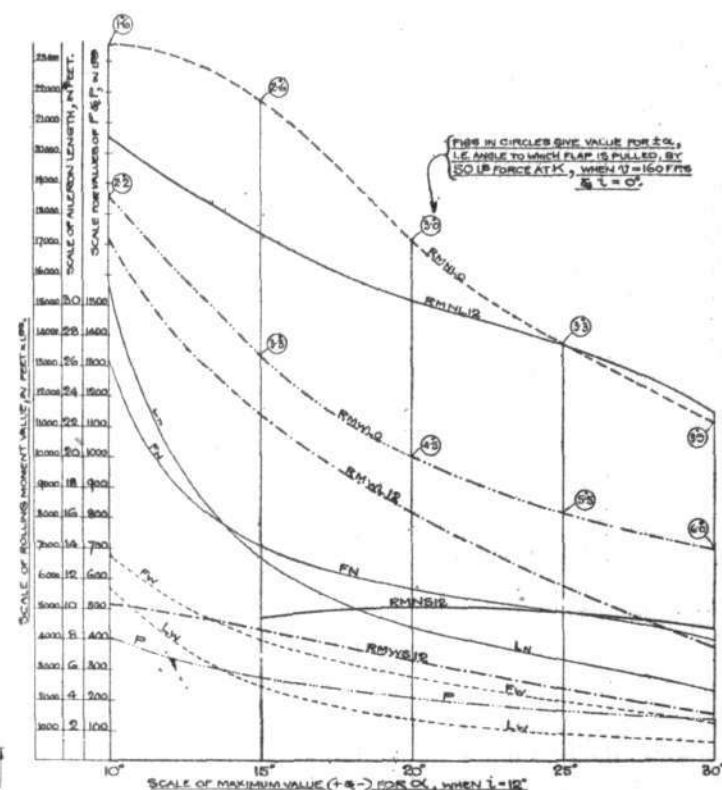


α	Le	Added Le	M	L	τ	V_t	α	f	p	f/p
+35	663	.097	.0130	.138	.709	.193	120	.978	1.091	.895
+20	711	.145	.0096	.206	.523	.394	100	.961	.719	1.34
+15	710	.148	.0082	.205	.447	.489	115	.782	.534	1.46
+10	628	.129	.0063	.184	.343	.536	110	.568	.343	1.65
+5	640	.074	.0049	.105	.267	.393	115	.301	.164	1.85
+25	606	.040	.0042	.087	.227	.811	123	.162	.060	2.02
0	566	—	.0034	—	.185	—	—	—	—	—
-25	492	.074	.0027	.103	.147	.718	—	—	—	—
-5	428	.198	.0019	.196	.104	1.88	—	—	—	—
-10	296	.270	—	.284	.000	00	—	—	—	—
-15	160	.406	.0016	.377	.087	6.63	—	—	—	—
-20	033	.531	.00056	.738	.196	3.83	—	—	—	—
-30	.024	.590	.00070	.840	.362	2.20	—	—	—	—

* from Appendix

IX.—Some points in aeroplane design.

SIMILARLY FOR FULL SIZE WINGS, AT 160 FT. (i=0) $y = \frac{7.96}{R_x = \alpha} \text{ IN FEET, (N)}$



CURVES FOR FLAP VALUES FOR BIPLANE OF 6' CHORD,
ASSUMING FORCE OF 50 LBS APPLIED AT K BY PILOT:-

P = RESULTANT TENSION APPLIED TO CONTROL WIRES

F_N = SUM OF UP & DOWN FORCES, FOR NARROW FLAPS

FW WIDE

LN = REQUIRED LENGTH FOR EACH OF FOUR NARROW FLA

RMNS 12 = ROLLING MOMENT ON SHORT SPAN BIPLANE W/

RMWS/2 = ROLLING MOMENT ON SHORT SPAN BIPLANE W/

RMNL 12 = " " " LONG " " "

BMW 12	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
BMW 12	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

RHINLO	風	0	-	78	69	75	82
RNIWLO	風	0	-	78	72	83	85

Figure 1. The effect of the concentration of the H_2O_2 solution on the amount of the released H_2O from the H_2O_2 -sensitive hydrogel.

* WHEN $T = 72.2^\circ \text{F}$ AND $h = +12$

Naturally the larger the flaps the greater would be their inertia, the greater would be the balanced tension in the control wires and the greater therefore the friction in the moving parts of the control system. So even if we assume that our model data is correct and the deductions made from them sound, it is probable that in practice it would prove better to use somewhat smaller flaps than are indicated as the best from this investigation. But it certainly seems correct to use narrow flaps and to make these flaps sufficiently long so as not to have to work them through too large a range.

I should have liked to look into the case of a biplane with flaps on the top wing only, as this system has some structural advantages. But unfortunately the only model data I have been able to obtain deals only with the case of pulling down the flap on the top wing of a biplane, and rather condemns the system for inefficiency on the results. To investigate the rolling moment we should need also the results with flap pulled up. I am inclined to believe that sufficiently long flaps on the top wing only of a biplane, pulled up and down of course, should give quite efficient lateral control, particularly if the top wing be larger than the bottom and if the machine be of the smallish span.

I now come to the final subject of which I have attempted a simple analysis. It is the comparison of different types of biplane structure.

Plate X.—Here are three biplanes with differing types of wing structure:—(A) is a single-bay type (often called "Scout" type, because it is the form of wing structure generally used on single-seated fighting machines which do not scout), with "mean" aspect ratio of 5 for top and bottom wings; (B) is a two-bay type, "mean" aspect ratio 7; (C) is a three-bay type, "mean" aspect ratio 9.

The comic rakes for all the tween wing struts have been perpetrated in order to obtain what the previous investigation gave as "economical" position of points of support for the spars of both top and bottom wings.

The wing areas for these three types have been arrived at by assuming that the total weight is the same for all three, and that the stalling speed near the ground is to be the same for all three, and using the maximum "absolute" lift coefficient values proper to the different aspect ratios from the "full-size" aerofoil curves given previously, Plate I. The maximum "absolute" lift coefficients are .535 for biplane (A), .543 for biplane (B) and .550 for biplane (C). Assuming total weight of each machine to be 2,600 lbs., (A) with its 375 sq. ft. has a wing loading of 6.94 lbs. per sq. ft.; (B)

with its 369 sq. ft. a loading of 7.05, and (C) with its 364 sq. ft. a loading of 7.15. For all three therefore the stalling speed near the ground is about 50 m.p.h.

Approximate calculations for the weight of the wing structure for each type were then made, using the following methods:—Total load for stress taken as 2,200 lbs., C.P. taken at .28 for stress on front spars. Spars, struts and tension wires, section and end shape of aerofoils, all taken as of "standard" forms previously described. Weights of top front spars were obtained by finding bending moment and end load just inside point B; the bending moment was multiplied by 1.2 for (A), by 1.15 for (B), and 1.10 for (C) to allow for increment due to end load. The necessary breadth, and thence cross sectional area, of "standard" I-section front spar was found which would give a maximum fibre stress of 800 lbs. per sq. in. when subjected to this total bending moment and end load, and it was assumed that this section was constant throughout the spar length, and that the timber was of 32 lbs. per cubic foot density. From the previously given curves of spar weights the weight of rear

spar was taken as $\frac{4}{3}$ times that of front spar.

For the bottom rear spars, the weights were obtained by finding the necessary breadth, and hence cross sectional area, of "Standard" I section spar which would give a maximum fibre stress of 800 lbs. per sq. in. when subjected simply to bending moment at outer support—i.e., G. for (A), H. for (B.) and J. for (C.) and assuming this section constant throughout spar length, and density of wood 32 lb. per cub. ft. For

bottom rear spars, the weights were taken as $\frac{4}{3}$ times those of front.

Weights of ribs were taken as proportional to square of chord length, and it was assumed that the weight of a rib of 6 ft. chord length would be $\frac{1}{2}$ lb. and that the rib spacing would be 12 in. in all cases.

Weight of covering was taken as 2 ozs. per sq. ft. of wing surface, meaning 1 oz. per sq. ft. of covering.

Total weight of leading edge, trailing edge and spacing battens was taken as the same per foot run in all cases, and as of .28 lb. weight per foot run. Weight of nosing ribs was taken as varying directly as chord of wing, and it was assumed that the number of nosing ribs was twice that of the ordinary ribs and that 36 nosing ribs for a wing of 6 ft. chord would weigh 1 lb.

Weight of compression members was taken as .4 lb. per ft.

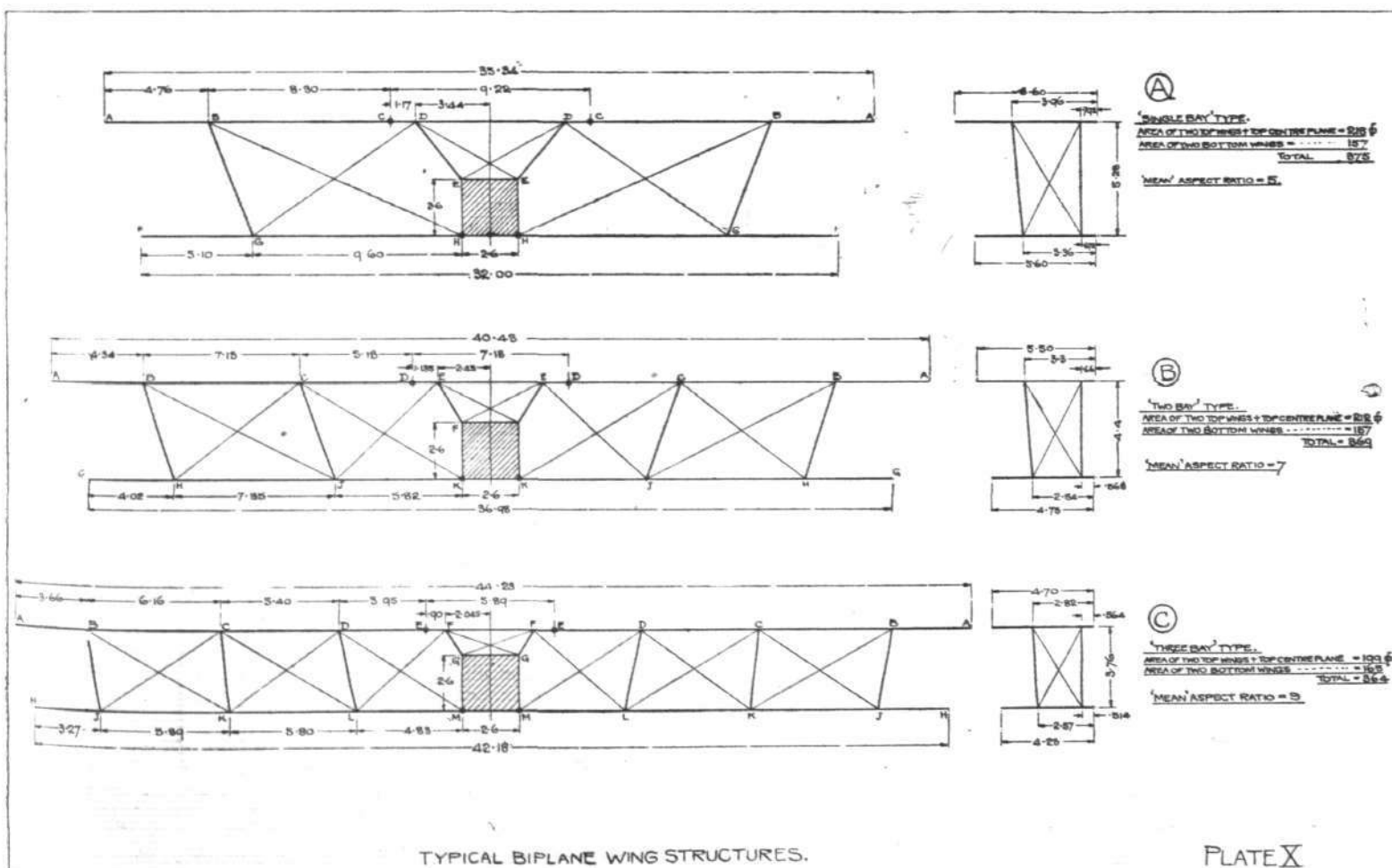


PLATE X.—Some points in aeroplane design

run for all cases. It was assumed that for case (A) there were 16 compression members in the two top wings and top centre plane, and 10 in the two bottom wings; that for case (B) there were 17 in the two top wings and top centre plane, and 12 in the two bottom wings; that for case (C) there were 21 in the two top wings and top centre plane, and 16 in the two bottom wings.

The weight of top wing and top centre plane spar fittings, at strut ends, was got by assuming that the weight of a fitting varies directly as the pull of the lift wires attached to it, and that a suitable fitting to take an ultimate lift wire pull of 7,000 lb. would weigh 1 lb. The weight of each bottom wing spar fitting at a strut end was taken as two-thirds of the weight of the corresponding top wing spar fitting. The weight of the fitting at the inner end of each wing spar, and at each end of each top centre plane spar, was taken as $\frac{1}{2}$ lb. in all cases. The weight of internal bracing wires was taken as .7 of the weight of compression members.

The weight of the front tween wing struts was obtained from the previously given formula, Plate V, the ultimate load being taken as seven times the normal flying load with C.P. at .28; the rear struts were taken as of same weight as the corresponding front struts.

The weight of the front centre plane struts was obtained by assuming that the total load for stress, except that fraction of it applied at the inner end attachments of the bottom wings, was to be taken equally by these two struts, and that their crippling load would be three times this. The rear centre plane struts were taken as of same weight as the front.

The weights of the front lift wires were obtained from the previously given formula (Plate VI); each front lift wire having an ultimate tensile strength of eight times the normal flying load with C.P. at .28. Rear lift wires were taken as of same weight as front, and ground wires as of one-half the weight per foot as that of corresponding lift wires. The wing bay incidence wires were taken as of same weight per foot as that of the ground wires in the bay inside and next to them. The top centre plane cross bracing and incidence wires were taken as one-half the weight per foot as that of the inner lift wires.

Weights of strut end fittings were taken as one-tenth weight of struts, and weights of end fittings proper to wires from previously given equation, Plate VI.

I have devoted considerable space to this rather uninteresting description of methods, but it was advisable to do so in case any misapprehension should be occasioned.

The weights obtained by these methods are as follows:—

		Case (A)	Case (B)	Case (C)
Two top wings and top centre plane	per cent.	50.3	48.7	46.2
	lbs.	180	168	153
Two bottom wings	per cent.	29.9	27.8	29
	lbs.	107	96	96
All struts	per cent.	10.3	11.6	11.5
	lbs.	37	40	38
All wires	per cent.	9.5	11.9	13.3
	lbs.	34	41	44
Total	per cent.	—	3.5	7.5
	lbs.	358	345	331

It will be seen that the weights are very much the same for all three types, (B) being about $3\frac{1}{2}$ per cent. lighter than (A), and (C) about $7\frac{1}{2}$ per cent. lighter than (A).

As case (C) gives a very shallow girder depth, I thought it advisable to find the alteration of weight due to increasing the gap, using of course the same methods as before. Increasing the gap will have the effect of lightening the top wing spars and spar fittings of both wings, of increasing the weight of the struts, and of decreasing the weight per foot of the tension wires but increasing their length; all other parts remain unaltered in weight. Three more cases were investigated (C₁) with gap equal to top wing chord; (C₂) with gap equal to 1.2 times top wing chord; (C₃) with gap equal to 1.4 times top wing chord. (C₁), (C₂) and (C₃) were in other respects the same as (C).

The weights obtained were:—

		Case (C ₁)	Case (C ₂)	Case (C ₃)
Two top wings and top centre plane	per cent.	42.9	39.4	35.9
	lbs.	148	142	141
Two bottom wings	per cent.	27.5	26.1	23.9
	lbs.	95	95	94
All struts	per cent.	17.1	22.8	29
	lbs.	59	82	114
All wires	per cent.	12.5	11.7	11.2
	lbs.	43	42	44
Total	per cent.	—	4.2	14
	lbs.	345	360	393

This gives the somewhat unexpected result that increasing the gap increases the total weight of wing structure, as the increase of strut weight is considerably greater than the decrease in spar and spar fitting weights, whilst the weight of the tension wires remains almost unaltered.

Having obtained comparative weights for the wing structures of these various types, I have proceeded to obtain figures for comparative head resistance of struts and wires for each case, by applying the formulæ as given before, Plates V and VI. The following are figures for the head resistance in lbs. at a wind speed of 100 ft. per second:—

	Case (A)	Case (B)	Case (C)	Case (C ₁)	Case (C ₂)	Case (C ₃)
All struts	7.6	8.8	9.1	13.0	17.1	22.3
All wires	7.9	9.5	10.6	10.9	11.4	12.3
Total	15.5	18.3*	19.7*	23.9	28.5	34.6

* 18 per cent. * 27 per cent.

The final quality compared was the moment of inertia of total wing structure about the fore and aft axis through C.G. of aeroplane. For this I assumed that the C.G. of the 2,200 lb. weight of the whole aeroplane, less wing structure, was situated in the centre of the square cross section of the body, in all cases. This gave the following figures:—

	Case (A)	Case (B)	Case (C)
Height of total C.G. above bottom of body ft.	1.57	1.49	1.42
Moment of inertia of two top wings and top centre plane per cent.	In lbs. x ft. 57.2 21,170	55.7 24,480	51.9 26,360
Moment of inertia of two bottom wings per cent.	27.7 10,270	28.2 12,400	31.7 16,080
Moment of inertia of all struts per cent.	9.3 3,440	9.5 4,150	9.1 4,610
Moment of inertia of all wires per cent.	5.8 2,160	6.6 2,910	7.3 3,700
	(100%)	(100%)	(100%)
Total moment of inertia of wing structure lbs.	37,040	43,940	50,750
per cent.	—	18.5	37

In obtaining these figures the wings were considered as homogeneous lamina, the struts and wires as homogeneous thin bars.

It only remains from the foregoing data to consider the comparative performances of these different types of biplanes. The following assumptions:—Everything except wing structure, tail size and fuel capacity, exactly the same for all cases. The 2,200 lb. weight to include 50 gallons petrol and an engine of 300 h.p. (using .6 pint per b.h.p. hour on full throttle). To bring machines A, B and C to the 2,600 lb. total weight, and therefore to the 50 m.p.h. stalling speed initially decided upon, we shall add petrol; Case (A) will therefore carry 50+6=56 gallons petrol; case (B) 50+8=58 gallons; case (C) 50+10=60 gallons.

We shall take the "total drag due to tail" for Case (A) to be .13 aerofoil drag at full speed and .052 aerofoil drag at climbing speed, and thence for Case (B) to be .108 at full speed and .043 at climbing speed, and for Cases (C), (C₁), (C₂) and (C₃) to be .093 at full speed and .037 at climbing speed; the variation in tail drag is arrived at by assuming that as the tail lever is constant and the wing area approximately constant, the pitching moment (and therefore required size of tail for stability) will vary directly as the wing chord, hence total "drag due to tail" will vary also directly as wing chord. Thrust horse-power at full speed 240 in all cases, and thrust horse-power climbing at 70 m.p.h. 180 in all cases. Head resistance of all other parts of the aeroplane except wing structure and tail 80 lb. at 100 f.p.s., and to vary as the square of the speed.

Case.	(A)	(B)	(C)
Maximum speed	m.p.h. 139.7	139.3	139.1
Duration at full speed	hours 2.49	2.58	2.67
Duration at full speed	miles 348	360	372
Initial climbing rate	ft./min. 1,610	1,660	1,710
Duration at 90 m.p.h.	hours 4.24	4.71	5.06
* Duration at 90 m.p.h. per cent.	—	11	20
Duration at 90 m.p.h.	miles 381	424	455

* Propeller efficiency taken as .8, petrol consumption as 1.0 pints/b.h.p. hr.

* Propeller efficiency taken as .8, petrol consumption as 1.0 pints/b.h.p. hr. Cases (C₁), (C₂) and (C₃) must be considered somewhat differently, for as they are of increasing gap value but of constant wing area value, if we stick to the 2,600 lb. total

weight, then their stalling speeds will be lower than the 50 m.p.h. decided upon. On the other hand, if we increase the weights as required to maintain the 50 m.p.h. stalling speed, we shall slightly decrease the strength. As a comparison, I have elected to stick to the 50 m.p.h. stalling speed, and I have assumed that the variation of lift coefficient values and of lift over drag values will alter in exactly the same proportions for the full-sized machines as they do for models, and I have used model figures given by the N.P.L. On these assumptions:—(C₁) may be loaded to 7.58 lbs. per sq. ft., meaning 2,760 lb. total weight for its 364 sq. ft. of wing area. (C₂) may be loaded to 7.73 meaning 2,810 lb. total weight. (C₃) may be loaded to 7.86, meaning 2,860 lb. total weight.

This means, of course, that (C₁) will carry 50 + 30 = 80 galls. petrol; (C₂) will carry 50 + 34 = 84 galls.; and (C₃) 50 × 37 = 87 galls.

Using the same methods of calculation as for Cases (A), (B) and (C) the following figures are obtained:—

Case	(C ₁)	(C ₂)	(C ₃)
Initial climbing rate f.p.m.	1,600	1,560	1,520
Cruising duration at 90 m.p.h.			
hours	6.6	6.8	6.9
miles	594	612	621

I have not worked out the high speeds, as they will certainly be slightly lower than for case (C), nor the moments of inertia, as they will certainly be higher than for (C).

The weak points in these calculations are:—Firstly and mainly, that values for "absolute" lift coefficient and for

"lift-over-drag" are taken from the curves of Plate I, and the accuracy of these curves is distinctly questionable. Secondly, no allowances have been made for the "interference" effects of the different parts of the wing structure upon one another; probably Cases (B) and (C) would be of slightly greater head resistance compared to Case (A) than as given, if "interference" were taken into account. Thirdly, no allowances have been made for propeller slip-stream effect on head resistance, and it is probable that this would have different comparative effects on the different types.

Taking the results for what they are worth, however, it would appear that for manoeuvrability and speed the shortish span machine has the advantage whilst for climb, weight-lifting and range the machine of high aspect ratio is very distinctly superior. The speeds, however, are rather remarkably alike, and the climbs also differ by quite small amounts, the greatest differences are superiority of duration at cruising speed for the long span machine and superiority of lateral quickness for the short span machine. Generalising, one might say that a smallish fighting or acrobatic machine should be of a fairly low aspect ratio, machines which are soberly to carry bombs, passengers or cargo should certainly be of high aspect ratio, and of good gap value.

I trust that the few cases I have dealt with, and at that sketchily, will serve at least one purpose—to emphasise that a vast amount of work may be put most usefully into analytical research as to economic conditions, for of all engineering structures the aeroplane is that one on which we can least afford to waste any weight or efficiency.

AVIATION IN PARLIAMENT

The R.N. A.A. Corps

Mr. LORT-WILLIAMS, in the House of Commons on March 3, asked the First Lord of the Admiralty whether men who have served in the Royal Naval Anti-Aircraft Corps (London Defence) are entitled to the service gratuity; and whether it is proposed to issue to them the war medal or some special medal for their services under fire?

Dr. Macnamara: Pensions and retired pay are awarded and remain payable in respect of services in His Majesty's Naval or Marine Force, subject to such conditions and provisions as are from time to time directed by Order in Council. Service pensions may most certainly be regarded as earned; but I am advised that they have never been regarded as deferred pay.

Dismantled Aeroplanes

Mr. JOYNSON-HICKS, on March 4, asked the Parliamentary Secretary to the Ministry of Munitions whether any D.H. 6 aeroplanes have been dismantled; what is the value of the produce of such dismantled machines; and whether he has received any offer for the purchase of such machines at a higher price than the scrap value?

Mr. Kellaway: In reply to the first part of the question, so far as the Ministry of Munitions is concerned, no D.H. 6 aeroplanes handed over to the Ministry for disposal have been dismantled; the second part of the question does not therefore arise. In reply to the last part of the question, a verbal offer for the purchase of such machines has been made at a price which is not considered high enough and has been declined.

R.A.F. Officers' Gratuity

Lieut.-Col. Sir F. HALL, on March 5, asked the Under-Secretary of State to the Air Ministry whether flying officers with four years' service are to receive £150 gratuity for each year; whether technical officers are to receive the same amount; and, if not, will he give particulars of the difference between the gratuities to be granted to these two classes of officers, stating at the same time what would be the amount of gratuity to be given to technical officers with the rank of captain with four years' service, and how much would be granted to flying officers of the same rank with a similar length of service?

Maj.-Genl. SEELY: Flying officers who were granted commissions in the Special Reserve of the Royal Flying Corps (and certain officers who entered the Royal Naval Air Service on special engagements) are entitled to gratuities of £150 for each completed year of service subject to certain conditions. Officers who entered the Special Reserve Royal Flying Corps, as technical officers (originally termed equipment officers) are not entitled to this gratuity, but receive instead a gratuity of 124 days' pay for the first year of service and 62 days' pay for each subsequent year or part of a year. The gratuity issuable to a technical officer of the rank of captain, with between four and five years' service, varies from £316 to £372. That issuable to a flying officer of the same rank and service varies from £353 to £372, if he was not on a Special Reserve engagement, and is £600 if he was on such an engagement.

Torpedo-carrying Aircraft

Lieut.-Col. MALONE asked the Under-Secretary of State to the Air Ministry whether proposals have been put before the Peace Conference for the total prohibition of torpedo-carrying aircraft?

Maj.-Genl. Seely: The answer is in the negative.

Lieut.-Col. Malone asked the Under-Secretary of State to the Air Ministry whether he has had an opportunity of investigating the history of the development of torpedo-carrying aircraft; and whether he will consider the appointment of a Commission to investigate why this weapon, which might have been a deciding factor in the war, was not further developed, and to apportion the blame accordingly.

Mr. Pratt: The Under-Secretary of State to the Air Ministry is away ill, and he hopes that the hon. and gallant member will agree to postpone his question for a week, as it is one that requires personal consideration.

Technical Pay

Sir F. HALL asked the Under-Secretary of State to the Air Ministry whether he is aware that an announcement was made before April 1 last that technical officers in the Royal Air Force would be granted technical pay and that this pay was to be according to some system of grading; if he will state what such system was and the rates of pay that were to be granted; whether he is aware that, after the announcement was made, without any further intimation, the original system was abandoned as impracticable and that

in September last it was announced that there would be an alteration in the rates of technical pay; if he will state what alterations were then proposed; whether any technical pay has actually been given and, if so, will he state the number of officers to whom it has been granted and upon what basis; and if steps will forthwith be taken to give this pay as originally announced, making it retrospective as and from the date of such announcement, in order that officers who may have been duly qualified, although they may have left the Service, shall obtain the additional pay it was intended that they should receive?

Maj.-Genl. Seely: The original Regulations for the pay of the technical branch of the Royal Air Force provided a basic rate of pay, according to rank, with the addition of technical pay of either 2s., 4s., 6s. or 8s. a day, varying according to (a) rank, and (b) the nature of the technical duties carried out by individual officers. It was found impracticable to grade officers individually for these rates of technical pay, and it was decided in September last to make the rate of technical pay dependent solely on rank. At the same time the different classes of technical duties carrying the right to technical pay were defined. The classification of officers according to these duties is being carried out and will shortly be completed. In the meantime technical pay at the original minimum rate for each rank has been issued, and any balance will be credited to officers as soon as the work of classifying them has been completed.

National Aircraft Factories

Mr. ROSE asked the Parliamentary Secretary to the Ministry of Munitions whether he will issue a statement relative to aircraft stations and establishments for the production of aircraft and aircraft requisites and accessories; how many of such establishments have been completely finished and in use; how many have been abandoned before completion; and what has been approximately the cost of completed establishments and those abandoned?

Mr. Hope: It is not quite clear what particular classes of establishments my hon. friend refers to, but I will have prepared and circulated with the Official Report a statement on national aircraft factories erected or purchased by the Ministry of Munitions.

Women's Royal Air Force

Mr. TURTON, on March 6, asked the Secretary of State for War if he will state approximately when demobilisation will take place of the Women's Royal Air Force; and when Form Z 527B will be issued?

Maj.-Genl. Seely: Demobilisation in the Women's Royal Air Force has commenced, and Form Z 527B, to which I understand the hon. member to refer, has been issued.

Air Mail Services

Mr. GILBERT asked the Postmaster-General whether any aerial post services have yet been started in this country; if not, whether it is intended that any such services shall be established at an early date; whether he will state if any experimental services have taken place either in this country or in connection with the postal services to Ireland and the Continent; and, in view of the establishment of such services in other countries, if he can make any statement on the subject?

Mr. Illingworth: No regular air post services have been established in this country, and I am not in a position to say when the establishment of any such services will become possible. There has been no recent experiment in air mail conveyance within the British Islands. I understand that an experimental service for Army mails only was begun a few days ago between Folkestone and Cologne, with intermediate points in Belgium.

The Flight to Madrid

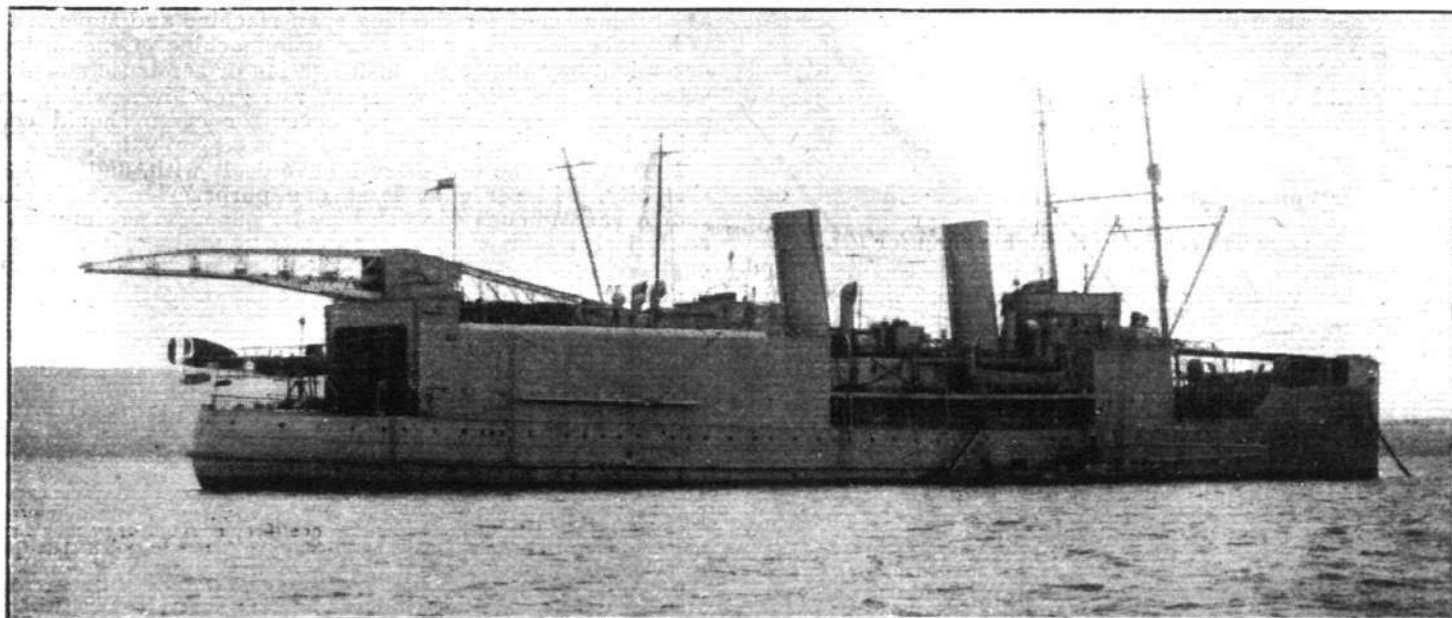
Mr. LYON on March 10 asked the Secretary of State for War if his attention has been called to the Statement that the Air Ministry had been obliged to abandon a proposed flight from London to Madrid on account of the perturbed state of Spain; has any communication from His Majesty's Ambassador at Madrid been received on the subject, or was there any communication with the Spanish Government or with the representative of that Government of the Court of St. James?

Major-General Seely: The statement was to the effect not that the proposed flight had been abandoned, but that it had been postponed. This decision was not come to as the result of any diplomatic representations, but it was considered that postponement was advisable in view of possible transport difficulties in connection with the extensive preparation required for an initial flight of this kind. The reports as to disturbances have been greatly exaggerated.

AIRISMS FROM THE FOUR WINDS

It was hardly a sane statement to set free that matters aerial were to come under the power the Government are hoping to obtain through the passing of the Ministry of Ways and Communications Bill. After the far-reaching bureaucratic authority, sought to be secured under this measure, anything, of course, was possible, but evidently

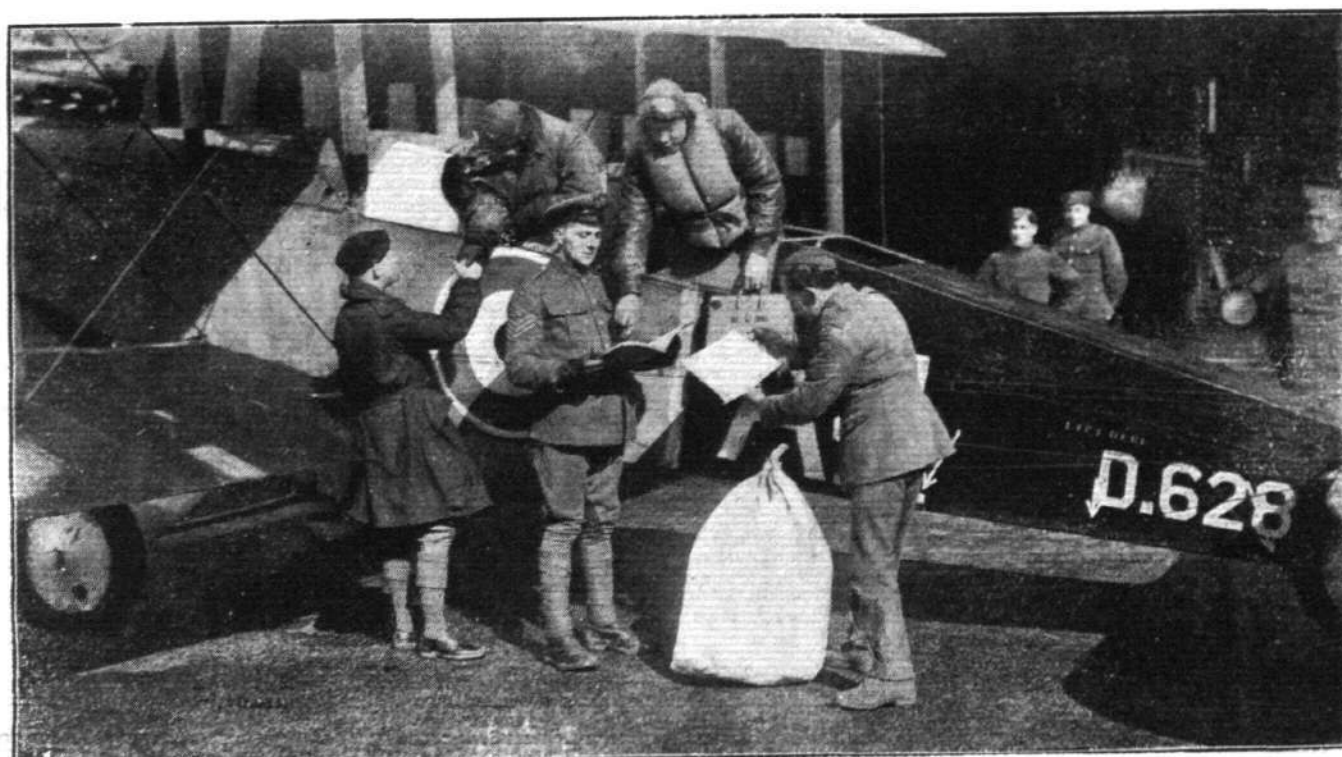
VERY illuminating to the man in the street must be the latest particulars issued in the official reports of the London Fire Brigade as to some of the more prominent houses and property damaged during the Hun air-raids over London. It has always been a sort of accepted fact that nothing but the dwellings in the poorer districts suffered destruction



H.M. Seaplane Ship "Navanna," a useful type of seacraft during the War : Note the 'plane being housed in the aft "hangar"

control of the air as well as the earth is a bit too much even for Sir Eric Geddes. Therefore it comes about that the "rumour"—or feeler, was it?—has been promptly denied officially, so that at least *that* part of the traffic of these islands will still remain free of the iron rail influence.

But the official facts now available once and for all put a stopper upon such silly vapourings. It might be that the Huns had actually *selected* the various targets, in order to impress, if the list of names affected is carefully studied. Most of the items were already known to ourselves, but there are



COLOGNE-FOLKESTONE AIR-MAIL SERVICE.—Arrival at Folkestone of the first Air-Mail from Cologne. The mail-bags being handed over to the military authorities.

several which, as a matter of fact, had escaped our record. Our only regret at seeing this roll of trouble in cold print is that it must convey a considerable amount of gruesome satisfaction to the devilish Hun to know that the air pilots were usually so successful in finding such satisfactory targets for their bombs. We only regret that the Armistice prevented a similar compilation being made of the Berlin residents of position and their troubles.

FIRST effects of the threatened coal-miners' trouble may be found in the following notice issued last week by Messrs. Vickers, Ltd., at their Sheffield works:—

"Coal shortage: The company has not been able to accumulate more than a few days' stock of coal, and if the threatened strike of miners takes place it will be impossible to carry on the departments which are large coal users. Other departments will be kept going as long as possible, but the company regrets to have to give notice hereby to determine the services of all workpeople on March 22; and until the proper supply of coal is assured engagements from that date will only be from day to day."

MORE and more to follow. Truly a case of dog eat dog.

ALL the monkeying about by the authorities in regard to first sanctioning, then calling off and then again smiling upon the proposed "flight" of some of our leading planes to Madrid for commercial "missionary" work, cannot but have a serious effect upon the minds of the very susceptible Spaniards. Matters are not so revolutionary in Spain as to warrant such vacillating policy, and it is to be hoped that reason will prevail, and the "samples" be on view at the Spanish capital, if only to save the face of British aerial enterprise.

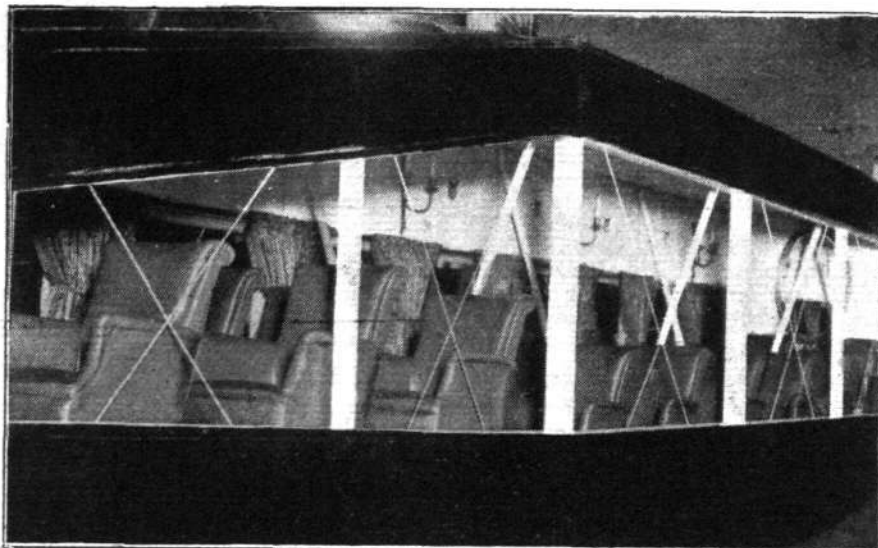
How silly it does seem for great departments to quibble over words. Having invited the sending of newspapers to our Army of Occupation on the Rhine, it was not very objectionable enterprise on the part of one of the London dailies to send a certain number of their journals addressed to members of the Army *via* the new Cologne air service and announce the fact. But no, if these papers went under cover that way, they would appear no longer to be newspapers and became "mails." So, out comes what would appear to be the rather misleading notice that "The statements which have appeared in certain newspapers that arrangements had been made for the conveyance of these

journals from England to the Western Front by the Official Aeroplane Mail Service are incorrect. The service is being entirely utilised for the carriage of mails for the troops."

THE question is, was it worth while?

It sounds a bit drastic that Parliamentary procedure should require from those interested in any particular national subject, a motion for the *reduction* of this or that Estimate of expenses for the current year, when every nerve is at the same time being strained by the self-same interest member to squeeze, *via* Parliament, the maximum amount of cash out of the Treasury for the particular object under discussion. Yet this thushness obtains. Hence arises the anomaly that in all probability this week in Parliament during the discussion on the Estimates under which the cost of the R.A.F. and Civil aviation comes, some keen friends of aviation will demand the reduction of the amount apportioned to this important asset of the Empire, so as to enable a full dress talk to take place upon the obstructive tactics which seem to prevail in regard to the carrying through of the means for development of the commercial side of aviation.

THURSDAY this week is probably the day for the perpetration, in the case of aerial matters, of this little parliamentary farce.



An "Open" side view of the passengers' cabin and seating accommodation of the Rolls-Royce twin-engined Handley-Page fuselage now on view at Selfridge's.



Some flying costumes for ladies, designed by and on view at Selfridge's.

PERSONALS

Casualties

Lieut. JOHN EDWIN PUGH, R.A.F., of 210th Squadron, and of H.M.S. *Princess Royal*, who died at Gosselies, near Charleroi, Belgium, on November 13, 1918, of wounds received on November 10, was the only son of Mr. and Mrs. John Pugh, Allesley, Warwickshire.

Lieut. JACK SYKES, Gordon Highlanders, attached R.A.F., first reported missing on October 4, 1918, aged 19, then prisoner of war; now known to have been killed in aerial combat, was the youngest son of the late Mr. J. D. Sykes, Bothorpe, Woking, and Mrs. Sykes, 108, Ebury Street, S.W.1.

Lieut. LOUIS DE VILLIERS WIENER, R.A.F., eldest son of Mr. F. R. Wiener, of Newlands, Cape Town, joined the original band of young South Africans recruited by Capt. Miller in February, 1917, when he was in his B.A. year at the South African College. In June of the same year he was commissioned, and some time afterwards went to France. It was during one of his flights that his engine was hit, but, in spite of this, he managed to land, but he suffered injuries which necessitated his going to hospital. A few months later he was back in France, and in April, 1918, after returning from a photographic flight, he encountered the famous von Richthofen "Circus," with the result that his observer was killed and the machine set "in a vertical spin." This was at an altitude of 10,000 ft., and his enemies, thinking that they had accounted for another British machine, flew back to their lines. At 8,000 ft., however, he regained control, only to be set into another spin of a few thousand feet, when he once more steadied his machine, and was about to make a landing when he went "dud," and fell 100 ft. He was picked up very much bruised and unconscious, but made a complete recovery some months later. After some home service in Wiltshire he returned to the front, and on November 4, with two other machines, he set out to take photographs over the German lines. He was last seen at about a height of 16,000 ft. None of the three machines returned, and Lieut. Wiener was posted missing from that date. Later his observer's grave was found near the Maas and one to "Lieutenant Wyner."

Capt. RUPERT ATKINSON, M.C., D.F.C., Croix de Guerre (Belgium), R.A.F., who died at High Kelton on March 7, at the age of 22, of pneumonia following influenza, while home on leave from Cologne, was the elder son of the late Brenan Atkinson, of Shanghai, and of Mrs. Atkinson, Berkhamsted.

Major FRANK LE M. CALLAWAY, R.A.F., who died at Aldershot Military Hospital on March 2, of influenza, was the youngest son of R. G. Callaway, retired Inspector of Machinery, R.N., and Mrs. Callaway.

Lieut. COLIN H. CLIFFORD, R.A.F., died of double pneumonia following influenza, at the R.F.C. Hospital, Eaton Square, London, on February, 10. He was the youngest son of Mr. and Mrs. George W. Clifford, of St. Hilary, Poole Road, Bournemouth, and late of Hadleigh, St. Sidwell's, Exeter, and was 23 years of age. In October, 1914, he enlisted in the R.F.C. as an air-mechanic, and rose to the rank of flight sergeant in December, 1916, in which year he went to France, obtained his pilot's certificate in the same year, and was given a commission in February, 1917. During the bad raids of that year he was actively engaged in night-flying in defence of London. He had a serious accident which rendered him unfit for flying for some time, but was able to return to active service about February, 1918. He was educated at Wimborne, and on September 17, 1918, married Miss Evangeline Hilliard, only daughter of the Rev. E. S. Hilliard, of Down Street, Mayfair.

Lieut. J. M. HANCOCK, R.A.F., who was killed on March 1, the result of a flying accident, was the eldest son of H. A. Hancock, Caulfield, Melbourne, Australia.

Married

Lieut.-Col. ALEXANDER CLEGHORN, R.A.F., eldest son of Mr. and Mrs. Alexander Cleghorn, 14, Hatfield Drive, Glasgow, W., was married on March 5 in the Bute Hall, Glasgow University, to MORAG ISABEL MARGARET, only daughter of Emeritus Professor BARR, D.Sc., LL.D., and Mrs. Barr, Westerton of Mugdock, Milngavie.

Lieut. FRANK COLIN CRAIG, R.A.F., second son of Mr. and Mrs. Frank Craig, of Perth, West Australia, was married on March 3 at Brompton Parish Church, to CONSTANCE JEAN GONVILLE BIRDWOOD, elder daughter of General Sir William and Lady Birdwood.

Lieut. ARNOLD WHITCHURCH LITTLE, R.A.F., only surviving son of the Rev. A. W. Little, M.A., and Mrs. Little, was married on December 21, 1918, at St. John the Evangelist, Holborn, to PHYLLIS MAY BURTONSHAW, younger daughter of the late W. J. NICHOLLS and Mrs. NICHOLLS, of London and Burnham-on-Crouch.

Capt. C. ADRIAN MAITLAND-HERIOT, D.S.C., R.A.F., second son of Mr. and the late Mrs. Fredk. Maitland-Heriot, of Buenos Aires, was married on February 27 at the Brompton Oratory, to DOROTHY, daughter of Mr. and the late Mrs. EGERTON-SAVORY, of Eastbourne.

Lieut. FRANK EUGENE ROBINSON, R.A.F., son of F. E. Robinson, Cleveland, Ohio, was married on March 4 at Marylebone Church, to ALIZON TRELAWNEY, daughter of WILFRID JOSEPH HOCKING, Priors Corner, Totteridge.

To be Married

The marriage arranged between Major E. M. L. AINSLIE, R.A.F., second son of Mr. and Mrs. Ainslie, of Hanworth House, Harrow Weald, and AUDREY, second daughter of the late Mr. Joseph CHARLESWORTH, of Glenapp Castle, N.B., and of Lofthouse Park, Wakefield, and Mrs. Hellins, of Marnhull Rectory, Dorset, will take place at Holy Trinity, Sloane Street, on April 10, at 2 p.m.

The engagement is announced and the marriage will shortly take place between Lieut. H. W. R. BANTING, R.M.R.E., and R.A.F., and Miss SERENA PHYLLIS LION, youngest daughter of Mr. John Lion, of Severn Lodge, Addison Road, W.

The engagement has been announced between Capt. G. H. BITTLES, R.A.F. (late flight lieutenant, R.N.A.S.), only son of the late Major G. H. Bittles, Indian Army, and of Coleraine, Co. Derry, Ireland, and NORA ELSIE BATHURST, only daughter of Mrs. K. M. Bathurst, of 9, Matheson Road, West Kensington, W.

The engagement is announced between Major K. T. DOWDING, D.F.C., the Queen's Regiment and R.A.F., son of Mr. and Mrs. A. J. C. Dowding, of 65, Wimbledon Hill, S.W., and ANGELA, daughter of Brig.-Gen. H. BLAND, C.B., and Mrs. BLAND, Bootham House, York.

A marriage has been arranged between Major W. H. TOLHURST, R.A.F., only son of Mr. and Mrs. Bernard Tolhurst, of Ditton Court, near Larkfield, Kent, and SHEILA, eldest daughter of Mr. and Mrs. RICHARD MARSH, Egerton House, Newmarket.

A marriage has been arranged and will take place on March 17 between DOUGLAS WILLIAM THORBURN, of Maybury Mansions, New Cavendish Street, W., and Wakefield House, Cheapside, E.C., and SUZANNE MARIE CAMILLE, only child of HENRI PEUCH, of Bois Colombes, near Paris, and Lyons, and grand-daughter of the late Col. La Flèche, of Beziers, France.

The engagement is announced between LEONARD A. RIVERS (late Lieut., R.F.C.), only son of Mr. and Mrs. J. S. RIVERS, of Coventry, and MURIEL EVELYN, elder daughter of Mr. and Mrs. HERBERT FITTON-ADAMS, of "Highdown," Godalming.

Items

Flt. Sub-Lieut. E. C. STOCKER, R.N.A.S., attached 22nd Wing, R.F.C., missing March 27, 1918, neighbourhood of Dompierre, with Aerial Gunner Claude Rendle, R.N., flying D.H.4 No. 8379; machine reported seen intact behind German lines.—Any information gratefully received by his mother at 50, Albany Road, Salisbury.

Sec. Lieut. SAMUEL ANDREW THOMPSON, R.A.F., attached Squadron 60, was last seen on September 5, 1918, flying west, away from two German scouts who were in pursuit. The number of his machine was S.E. 5a; C. 1876, and it is thought that he may have had to land, and is now a prisoner.—Any information concerning his fate will be gratefully received by his father at 2921 Scott Street, Vancouver, B.C., Canada.

THE ROYAL AIR FORCE

London Gazette, Feb. 28

Technical Branch

Lieuts. (A.) to be Lieuts. (Grade A).—J. Toogood; Sept. 7, 1918 (substituted for notification in *Gazette* Oct. 18, 1918). H. Forrest; Dec. 5, 1918. W. A. Harvey; Jan. 3.

Lieuts. (Ad.) to be Lieuts. (Grade B).—E. A. Bastow; Sept. 1, 1918. H. C. Reade; Dec. 23, 1918.

Sec. Lieut. P. G. Pickwell to be Lieut.; Aug. 19, 1918 (substituted for notification in *Gazette* Jan. 3).

Sec. Lieut. C. H. V. Hayman to be actg. Lieut. while employed as Lieut. (Grade A); Oct. 2, 1918.

Sec. Lieuts. to be actg. Lieuts. while employed as Lieuts. (Grade B).—(Hon. Lieut.) E. L. Pollard, M.C.; May 22, 1918. C. B. Stamp; June 22, 1918. T. Hodgson; July 27, 1918. C. Brewster, W. J. Shilcott; Aug. 27, 1918. W. Haddon; Sept. 17, 1918.

Sec. Lieuts. to be Sec. Lieuts. from (Ad.).—A. E. S. Baker (Grade A); Nov. 1, 1918. E. W. Reynolds (Grade A); Jan. 15. I. M. Gee (Grade B); Feb. 3.

Sec. Lieut. A. Elson is confirmed in his rank as Sec. Lieut.; April 1, 1918.

The following are transd. to Unemployed List:—Lieut. B. S. S. Rokeby; Jan. 7. Capt. C. C. Clarke, Sec. Lieut. H. G. Cogle, Sec. Lieut. F. W. Waller; Jan. 18. Lieut. (actg. Capt.) T. Moore; Jan. 21. Capt. B. B. J. A. O'Donnell, M.C.; Jan. 29. Lieut. (Hon. Capt.) R. H. Sievwright; Jan. 26. Lieut. L. F. Williams; Jan. 27. Lieut. G. P. Harmer, Sec. Lieut. C. H. Martin; Jan. 29. Sec. Lieut. C. B. Stamp, Lieut. H. Straker; Jan. 31. Sec. Lieut. E. C. Harris, Lieut. H. Munro, Capt. S. Morris, Sec. Lieut. F. G. Rison; Feb. 1. Sec. Lieut. P. C. Le G. Starkie; Feb. 4. Capt. G. K. Greig, Sec. Lieut. E. C. Steel; Feb. 5. Lieut. (actg. Maj.) T. Knowles; Feb. 6. Sec. Lieut. A. C. Geen; Feb. 7. Sec. Lieut. G. Barnes, Sec. Lieut. D. W. Godden, Sec. Lieut. (Hon. Lieut.) A. A. Punt; Feb. 8. Sec. Lieut. H. A. Creswell, Lieut. H. A. Evans, Sec. Lieut. (Hon. Lieut.) A. C. Jenkins, Lieut. J. G. Speirs; Feb. 9. Sec. Lieut. P. L. Smith; Feb. 10. Capt. W. R. Abbott, Sec. Lieut. S. G. Hurley; Feb. 11. Lieut. R. F. D. Hocker; Feb. 13. Sec. Lieut. L. A. Briggs, Sec. Lieut. E. H. Flook; Feb. 14. Capt. E. B. Falkner; Feb. 15. Sec. Lieut. (Hon. Capt.) N. S. Sennett, Sec. Lieut. R. E. Townshend; Feb. 16. Lieut. F. D. Crane; Feb. 17. Lieut. (actg. Capt.) O. F. Cooke-Yarborough; Feb. 18. Sec. Lieut. S. H. Morgan, Lieut. (actg. Capt.) G. V. Stringer, M.C.; Feb. 19.

Capt. O. S. Mosley-Leigh relinquishes his commn. on account of ill-health, and is permitted to retain his rank; March 1.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—C. R. Becke, E. C. Thompson; March 1.

Sec. Lieut. (Hon. Lieut.) F. M. V. Earle relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain the rank of Sec. Lieut.; March 1.

Sec. Lieut. A. Scott relinquishes his commn. on account of ill-health, and is permitted to retain his rank; March 1.

The date of appointment of Capt. (actg. Maj.) W. A. B. Laing is Nov. 6, 1918, and not as stated in *Gazette* Dec. 31, 1918.

The notification in *Gazette* Dec. 24, 1918, concerning Lieut. T. J. Owen is cancelled.

The notification in *Gazette* Jan. 21 concerning Sec. Lieut. (actg. Lieut.) H. F. Weet is cancelled.

The name of Sec. Lieut. F. A. Matthews is as now described, and not as in *Gazette* Oct. 15, 1918.

The date of appointment of H. V. Lawley as Sec. Lieut. is Oct. 14, 1918, and not as stated in *Gazette* Dec. 13, 1918.

Medical Branch

W. F. Jones (Temp. Surg. Lieut. R.N.) is granted a temp. commn. as Capt.; Oct. 1, 1918, seniority April 1, 1918.

R. S. Topham (Temp. Capt., R.A.M.C.) is granted a temp. commn. as Capt.; Oct. 1, 1918, seniority April 23, 1918.

The following temporary appointments (Women's Royal Air Force) are made at the Air Ministry:—

Memoranda

Officers of the Regular Army, Special Reserve, and Territorial Force, who have held temporary commissions in the Royal Air Force either by virtue of notification in *Gazette*, April 2, 1918, or otherwise, and who have subsequently relinquished or otherwise voluntarily terminated their commissions in the Regular Army, Special Reserve, or Territorial Force, and whose temporary commissions in the Royal Air Force were thereby terminated, are granted temporary commissions in the Royal Air Force from the date of the termination of their commission in the Regular Army, Special Reserve, or Territorial Force, with such rank, appointment, and precedence in the Royal Air Force as they held therein immediately prior to such relinquishment or termination as aforesaid. Lieut. P. G. Pickwell to be actg. Capt. while holding a special appointment at the Ministry of Munitions; Aug. 1, 1918. Sec. Lieuts. R. D. Forrester relinquishes his commission on ceasing to be employed; Sept. 18, 1918.

The following are transd. to unemployed list, from (S.O.):—Capt. L. S. B. Hull; Jan. 15 (substituted for notification in *Gazette*, Jan. 24, concerning Capt. L. S. Benson); Lieut. (actg. Capt.) R. H. Spencer; Jan. 23. Sec. Lieut. (actg. Lieut.) W. R. Simpson; Jan. 26. Lieut. (actg. Capt.) R. MacFarlane; Jan. 29. Maj. (actg. Lieut.-Col.) G. D. Pidgeon; Feb. 4. Sec. Lieut. (actg. Lieut.) A. Davies; Feb. 11. Maj. J. C. Savage; Feb. 18.

London Gazette, March 4.

The following temporary appointment is made at the Air Ministry:—*Staff Officer, 2nd Class.*—(P.)—Capt. G. C. Gold, and to be actg. Maj. whilst so employed; Feb. 11.

The following temporary appointments are made:—*Staff Officer, 2nd Class.*—(P.)—Capt. P. P. C. Penberthy, and to be actg. Maj. whilst so employed; Feb. 13.

Staff Officer, 3rd Class.—(P.)—Sec. Lieut. A. Jukes, and to be actg. Capt. whilst so employed; Feb. 13.

Flying Branch

Maj. (actg. Lieut.-Col.) M. G. B. Copeman to be Maj. (A.), from S.O., and relinquishes the actg. rank of Lieut.-Col.; Feb. 24.

Capt. L. N. Glaisby, D.S.O., to be graded for pay as Capt. whilst employed as Capt. (A.); Aug. 1, 1918.

Cadts. to be graded for pay as Cadts. whilst employed as Cadts. (O.):—L. V. Peakes, J. L. Kerry, D.S.C.; July 1, 1918.

Lieuts. to be actg. Cadts. whilst employed as Cadts. (A.):—(Hon. Capt.) R. H. Hawkins; July 15, 1918. S. G. Knock, A. M. West; Sept. 1, 1918. E. H. M. Fetch; Sept. 28, 1918. H. H. Cotton (Quebec R.), D. Langlands; Oct. 1, 1918. W. Windrum; Oct. 14, 1918. (Hon. Capt.) H. A. Courtenay; Nov. 3, 1918. A. A. Duffus; Dec. 1, 1918.

Lieut. S. D. Culley, D.S.O., to be actg. Capt. whilst employed as Capt. (A. and S.); Nov. 1, 1918.

Sec. Lieut. G. J. Gawthorne, D.S.M., to be actg. Lieut. (K.B.) whilst employed as Balloon Comdr.; June 30, 1918.

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. H. J. Copp; Sept. 21, 1918. Sec. Lieut. E. H. Searle (and is permitted to retain his rank); Dec. 14, 1918 (substituted for notification in *Gazette* Dec. 13, 1918, concerning Sec. Lieut. E. H. Seale); Lieut. S. F. Ireland, Lieut. (Derby. Yeo.); Jan. 10. Lieut. A. R. Taylor, Lieut. (Midd'x. R.); Jan. 11. Sec. Lieut. F. J. Cotsell (Lond. R., T.F.); Jan. 22. Sec. Lieut. (Hon. Lieut.) G. H. Hunt (Lieut., Sask. R.); Jan. 28. Lieut. C. Burgener (Lieut., E. Ont. R.); Jan. 30. Sec. Lieut. (Hon. Lieut.) F. B. Walls (Lieut., C. Ont. R.); Feb. 10. Sec. Lieut. A. Lewin (Sec. Lieut., R.W. Kent R.); Feb. 13. Sec. Lieut. A. C. Rees; Feb. 18. Lieut. F. M. Sellars (Lieut., R. Newfoundland R.); Feb. 26.

The following are transd. to the Unemployed List:—Sec. Lieut. G. B. Allen; Jan. 5. Lieut. J. B. Anderson, M.C.; Jan. 12. Sec. Lieut. J. A. W. Jarvis; Jan. 13. Capt. H. H. Watkins, Sec. Lieut. D. K. Watt; Jan. 14. Sec. Lieut. B. G. J. Wood; Jan. 17. Lieut. (actg. Capt.) S. J. Vine; Jan. 18. Lieut. H. Rudd; Jan. 20. Lieut. W. M. M. Elvery, Sec. Lieut. S. Lee. Jan. 21. Lieut. D. W. T. Fox, Lieut. R. McL. Knox; Jan. 22. Sec. Lieut. C. Crewe, Capt. (actg. Maj.) C. O. Fairbairn (N. Lancs. R.), Lieut. H. R. Herne, D.F.C., Capt. (actg. Maj.) S. Whitechurch; Jan. 23. Lieut. E. W. Desbarats, Lieut. H. A. Grover, Sec. Lieut. W. Hopkins, Sec. Lieut. T. Shortland-Jones; Jan. 24. Lieut. C. M. Hyslop, Sec. Lieut. H. Raper, Sec. Lieut. G. Richardson, Lieut. B. R. Redman; Jan. 25. Lieut. W. B. Woodland; Jan. 27. Lieut. J. H. Jenkinson, Lieut. J. A. Smale, Sec. Lieut. (actg. Capt.) A. H. Warriner; Jan. 28. Capt. C. L. Bailey, Sec. Lieut. R. Clark, Sec. Lieut. C. D. Reid, Lieut. H. Whitehead; Jan. 29. Lieut. W. H. Daish (Lond. R.), Capt. W. R. M. Hill; Jan. 30. Sec. Lieut. J. H. Gidman, Sec. Lieut. (Hon. Capt.) R. F. Lee, Maj. J. B. Vernon; Feb. 1. Lieut. R. G. Davison, Capt. J. R. Fasson, Sec. Lieut. K. Fletcher, Lieut. J. L. Horne, A.F.C., Sec. Lieut. J. B. Spence, Sec. Lieut. T. Whittles; Feb. 2. Sec. Lieut. R. W. Barten, Capt. W. B. Farrington, D.S.O. (Notts. and Derby R.), Sec. Lieut. J. B. Roberts; Feb. 3. Sec. Lieut. (Hon. Lieut.) G. Boyce, Sec. Lieut. W. H. Hellier; Feb. 5. Lieut. J. K. Fisher, Sec. Lieut. R. F. Hunter, Sec. Lieut. J. Ure; Feb. 6. Sec. Lieut. K. L. Birtwistle, Sec. Lieut. E. R. Davis, Sec. Lieut. L. G. W. Howles, Sec. Lieut. S. Hamilton; Feb. 7. Lieut. J. H. T. Davies, Sec. Lieut. R. M. Helm, Capt. F. G. Hortsmann, D.S.C., Sec. Lieut. G. H. W. Legge; Feb. 8. Sec. Lieut. E. Brogan, Lieut. J. Heys, Sec. Lieut. A. D. Hegan, Lieut. H. S. H. Read; Feb. 9. Sec. Lieut. A. C. Breiman, Sec. Lieut. E. W. Dewell, Sec. Lieut. A. C. Grave, Sec. Lieut. E. W. Hargreaves, Lieut. G. R. Haigh; Feb. 10. Sec. Lieut. (Hon. Lieut.) H. Bardsley, Lieut. B. A. Elliman, Sec. Lieut. H. W. Evans, Sec. Lieut. D. Fraser, Lieut. E. W. Geere, Lieut. H. S. Gros, Lieut. R. W. Gosse (Northamp. R.), Lieut. C. Jowsey, Capt. L. V. Kahn, Lieut. E. H. Wells, Lieut. G. H. Wiggins; Feb. 11. Sec. Lieut. R. H. Bailey, Lieut. T. S. Brazendale, Lieut. A. Chapman, Sec. Lieut. L. S. Dare, Sec. Lieut. W. Drags, Sec. Lieut. (Hon. Lieut.) J. J. St. J. W. Devey, Sec. Lieut. F. W. Foster, Capt. A. R. L. Goodson, Lieut. A. J. Golding, Lieut. L. H. Kearne, Sec. Lieut. D. L. N. Grownas, Lieut. A. H. Webber, Lieut. L. Whistler; Feb. 12. Lieut. (actg. Capt.) W. Bruce, A.F.C., Sec. Lieut. A. R. Cotton, Sec. Lieut. H. C. Dakin, Lieut. G. S. Dalgleish, Sec. Lieut. J. C. Fairfax, Sec. Lieut. R. G. Gibbs, Lieut. J. L. K. Gifford, Sec. Lieut. W. S. Greenwood, Sec. Lieut. A. M. Haybittle, Sec. Lieut. B. W. Joyce, Sec. Lieut. F. C. Weatherley; Feb. 13. Lieut. H. Barningham, Sec. Lieut. F. Birkett, Lieut. J. E. Burke (R.G.A., S.R.), Sec. Lieut. H. G. Chapman, Sec. Lieut. L. B. Clarke, Sec. Lieut. K. C. W. Craig, Sec. Lieut. P. F. A. Curtis, Capt. J. C. B. Firth, M.C., Sec. Lieut. W. S. Dailey, Capt. J. G. Hudson, Maj. R. J. Hudson, M.C. (R. Fus., S.R.), Lieut. A. F. Smith, Sec. Lieut. H. A. Welch, Sec. Lieut. G. V. Yorke; Feb. 14. Capt. H. Barker, Lieut. W. K. Bradley, Lieut. H. S. Boulding, Sec. Lieut. J. G. Dunlop, Lieut. A. F. Forsyth, Sec. Lieut. C. F. Geyton, Lieut. G. Gibbons (Lond. R.); Lieut. J. E. N. Godrich, Lieut. C. W. D. Holmes, Sec. Lieut. H. Howarth, Lieut. J. Haygarth, Lieut. R. K. Harrison, Sec. Lieut. F. L. Innes, Sec. Lieut. G. W. Webster; Feb. 15. Sec. Lieut. J. C. Castle, Sec. Lieut. H. J. Crisp, Capt. H. Rampling; Feb. 16. Lieut. J. W. Blagg, Lieut. A. T. Burgess, Sec. Lieut. A. E. Cohen, Capt. A. J. Elstone, Lieut. G. H. Fender (R.W. Kent R.), Sec. Lieut. J. B. Holbrook, Sec. Lieut. H. S. Slinger; Feb. 17. Sec. Lieut. S. H. Apling, Lieut. W. F. T. Coutts, Sec. Lieut. K. J. Cadwalader, Sec. Lieut. C. F. Coates, Sec. Lieut. N. V. Gay, Capt. H. N. Warburton, Sec. Lieut. S. T. Westcott; Feb. 18. Lieut. P. Allsopp, W. Riding (R. T.F.), Sec. Lieut. J. Biggam, Lieut. J. S. Bowker (Man. R. T.F.), Sec. Lieut. F. H. Cowley, Sec. Lieut. A. R. Courtis, Lieut. M. S. Faraday (R.F.A.), Lieut. P. L. J. Gardner, Sec. Lieut. J. W. Craig, Capt. H. D. Cutler, Lieut. J. S. Hogg, Lieut. H. J. S. Quarterman, Sec. Lieut. F. P. Wheeler; Feb. 19. Sec. Lieut. S. W. Hollingworth, Sec. Lieut. F. D. Smith, Sec. Lieut. R. F. Tunaley, Sec. Lieut. H. H. Watts; Feb. 20. Sec. Lieut. W. Ashford, Lieut. S. H. B. Emms, Sec. Lieut. W. E. Hole; Feb. 21. Sec. Lieut. R. C. Collinswood; Feb. 22. Sec. Lieut. J. E. Berry, Sec. Lieut. Z. J. Bissonnette, Sec. Lieut. J. A. Burgess, Sec. Lieut. S. R. Housen, Sec. Lieut. J. O. Huddart; Feb. 23. Sec. Lieut. D. W. Gracey; Feb. 28. Lieut. S. W. Dronsfield; March 3. Sec. Lieut. E. W. Cockroft; March 5.

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—F. E. Bambridge (caused by wounds) and G. Beveridge (contracted on active service), D. G. Brown (contracted on active service), C. F. Eckel, M. C. Kinney (contracted on active service), F. J. K. Mason; March 5.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—S. W. Atkinson, J. Potter (contracted on active service), W. F. M. Wise (contracted on active service); March 5.

The Christian names of Flight Cadet Stanley Ward are as now described, and not as stated in *Gazette* Feb. 14.

The surname of Sec. Lieut. S. A. W. Setchell is as now described, and not as stated in *Gazette* Sept. 24, 1918.

The initials and surname of Sec. Lieut. J. E. Mutty are as now described, and not as stated in *Gazette* Feb. 4.

The number of Flight Cadet H. Lyne is 551032, and not 851032, as stated in *Gazette* Dec. 10, 1918.

The notification in *Gazette* Jan. 31 concerning Lieut. J. A. Johnston, M.M. (Manitoba R.), is cancelled.

Administrative Branch

Maj. I. A. S. Cooke, O.B.E., to be Maj., from (S.O.); Feb. 26.

Lieuts. to be actg. Cadts. while employed as Cadts.:—(Hon. Capt.) F. W. Napper; Aug. 1, 1918. A. F. Tabraham; Aug. 28, 1918. R. C. Byass, P. C. Coote, A. J. Croft, M.C., E. Emley; Sept. 1, 1918. G. H. Hill; Sept. 17, 1918. W. N. Cuthbert; Nov. 1, 1918. E. S. C. Brooks; Feb. 1, 1919.

Sec. Lieuts. to be actg. Cadts. while employed as Cadts.:—(Actg. Lieut.) W. W. Shuker; Aug. 1, 1918. (Hon. Lieut.) (actg. Lieut.) H. L. Marston

Sept. 26, 1918. F. D. Owen; Oct. 1, 1918. W. F. M. Hopkins; Nov. 10, 1918. J. Bushell, from (T.); Dec. 1, 1918.

Lieuts. (A.) to be Lieuts.—K. B. Preston; Aug. 9, 1918. (Hon. Capt.); H. L. Symons (Can. Engrs.); Sept. 12, 1918. R. W. P. Goodwin; Nov. 20, 1918. W. R. Heaton; Dec. 2, 1918. S. N. Jones (actg. Capt.); J. V. Turner, and relinquishes actg. rank of Capt.; Dec. 12, 1918. E. C. Hoar; Dec. 21, 1918. S. Blair; Jan. 9. D. R. Rankin; Jan. 23. D. H. Bevan; Jan. 27.

Lieut. S. de Frietas to be Lieut., from (K.B.); July 8, 1918.

Lieuts. (O.) to be Lieuts.—R. Fitton, M.C.; Nov. 12, 1918. W. A. Knight; Jan. 3. W. J. Harvey, M.C.; Jan. 10. G. E. Maxwell; Feb. 3.

Sec. Lieuts. to be actg. Lieuts. whilst employed as Lieuts.—(Hon. Lieut.) I. Cobley; Sept. 1, 1918. L. A. T. Power, from (T.); Oct. 1, 1918. W. H. Short, from (T.); Nov. 1, 1918. L. Smith, from (O.); Feb. 21.

Sec. Lieuts. to be Sec. Lieuts., from (A.)—J. A. Tomson; Oct. 7, 1918. A. F. Webster; Oct. 24, 1918. W. M. McNeill-Hamilton; Nov. 15, 1918. M. D. Hart; Nov. 26, 1918. W. C. Marshall; Jan. 13. H. J. Smith; Feb. 4.

Sec. Lieuts. to be Sec. Lieuts., from (A. and S.)—W. O. Jones; Nov. 5, 1918. F. L. Catterall; Dec. 31, 1918.

Sec. Lieuts. to be Sec. Lieuts., from (O.)—A. Whiclow; Dec. 2, 1918. P. H. Montgomery; Dec. 3, 1918. W. J. Bradshaw, Hon. Lieut. C. M. McGorrey (and to be Hon. Lieut.); Dec. 5, 1918. H. Hood; Dec. 13, 1918. H. G. Biltcliffe; Dec. 16, 1918. F. D. McClinton; Dec. 19, 1918. G. D. Knighton; Jan. 1. H. E. Hinchliffe; Jan. 11. I. MacL. Moffatt; Jan. 20. R. E. Clark; Jan. 24. V. C. Turner; Jan. 29. Hon. Lieut. W. A. B. Eastwood; Jan. 31, and to be Hon. Lieut.

The following are transf'd. to Unemployed List.—Lieut. J. Arch; Jan. 11. Capt. V. G. Davies; Jan. 19. Sec. Lieut. G. Dignam; Jan. 24. Lieut. (actg. Capt.) C. E. Collins; Jan. 23. Lieut. F. A. Rhodes; Jan. 24. Sec. Lieut. J. Whittaker; Jan. 26. Lieut. (actg. Maj.) J. G. Lumsden; Jan. 28. Sec. Lieut. J. W. Corbie; Jan. 29. Maj. (Hon. Lieut.-Col.) Hon. V. A. F. V. Russell; Jan. 30. Sec. Lieut. G. E. Kollason, Sec. Lieut. M. P. Stoneham, Sec. Lieut. A. E. Steel; Feb. 2. Lieut. J. S. Rissen, Sec. Lieut. L. Wardle-Donald; Feb. 5. Sec. Lieut. J. F. George, D.S.M.; Feb. 6. Sec. Lieut. J. W. S. Appleton; Feb. 8. Sec. Lieut. R. Breese; Feb. 10. Lieut. (actg. Capt.) E. E. Hardie, Sec. Lieut. A. K. Kennedy; Feb. 11. Sec. Lieut. I. Edelman, Sec. Lieut. H. Forbes; Feb. 12. Sec. Lieut. A. N. Dale; Feb. 13. Lieut. J. E. F. Dell, Lieut. G. Dodds; Feb. 15. Sec. Lieut. F. O. Finn; Feb. 16. Capt. C. J. Griffiths; March 5.

Sec. Lieut. (Hon. Capt.) M. E. Leeb relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain the rank of Capt.; March 5.

The following Lieuts. relinquish their commns. on account of ill-health contracted on active service, and are permitted to retain their rank.—R. D. K. Taylor, C. L. White; March 5.

The following Sec. Lieuts. relinquish their commns. on account of ill-health and are permitted to retain their rank.—H. Andrew, F. W. Birkenshaw, L. H. Meyer, R. P. Squire, G. R. Shibley (contracted on active service) T. Wheeler (contracted on active service); March 5.

The initials of Lieut. (actg. Capt.) H. N. Giles are as now described, and not as stated in *Gazette* Feb. 25.

Technical Branch

C. H. R. E. Raven (Lieut., R.E., T.F.) is granted a temp. commn. as Capt. (Grade B.); April 1, 1918.

Lieuts. to be actg. Capts. whilst employed as Capts. (Grade A.)—A. Fincher Brookes, A. G. Harrison, A. H. Rayner; Nov. 1, 1918.

Lieuts. to be actg. Capts. whilst employed as Capts. (Grade B.)—W. H. M. Groom; June 18, 1918. P. H. Shone (but without pay and allowances); Sept. 1, 1918. A. E. Cambridge, from (O.); Sept. 12, 1918. H. Smith; Oct. 1, 1918.

Sec. Lieuts. to be actg. Capts. whilst employed as Capts. (Grade A.)—H. Satterford; May 6, 1918. (Actg. Lieut.) E. F. Sutton; July 20, 1918. (Hon. Lieut.) J. H. Ward; Dec. 1, 1918. E. T. W. Nockold; Jan. 1.

Sec. Lieuts. to be actg. Capts., whilst employed as Capts. (Grade B.)—(Hon. Lieut.) B. L. Bromley; Nov. 1, 1918. (Actg. Lieut.) G. Baker (from Ad.); Dec. 1, 1918.

Sec. Lieuts. to be actg. Capts. (with pay and allowances of Lieuts.) whilst employed as Capts. (Grade B.)—(Hon. Lieut.) R. C. Broughton, (Hon. Lieut.) A. N. Pictor, (Hon. Lieut.) P. H. West; Sept. 1, 1918. (Actg. Lieut.) A. W. Summers; Dec. 1, 1918.

Lieuts. to be Lieuts. (Grade B.)—(Hon. Capt.) D. D. Drury, from (A.); Aug. 3, 1918. J. C. McKeever (C. Ont. R.), from (Ad.); Nov. 20, 1918.

Lieut. J. W. Parkinson to be graded for pay as Lieut. whilst employed as Lieut. (Grade B.); Oct. 1, 1918.

Sec. Lieuts. to be actg. Lieuts. whilst employed as Lieuts. (Grade A.)—J. Y. Watson; Sept. 1, 1918. H. Williams; Oct. 1, 1918. P. D. Wilson; Oct. 21, 1918. W. R. Day; Nov. 1, 1918.

Sec. Lieuts. to be actg. Lieuts. whilst employed as Lieuts. (Grade B.)—E. A. Moran-Smith; May 22, 1918. H. Stafford; Aug. 1, 1918. A. E. Williams; Aug. 14, 1918. R. J. D. Killick, A. P. Woollett; Sept. 1, 1918. W. C. Burns, H. J. Grant, from (O.); J. A. Joyce; Oct. 1, 1918. F. S. Stokes; Nov. 1, 1918. S. J. Edwards, L. Evans, J. Rolls, I. Samber; Dec. 1, 1918. H. A. Lyford; Jan. 1.

Sec. Lieuts. to be Sec. Lieuts. (Grade A), from (Ad.)—W. A. Murphy; April 1, 1918. E. G. Harris; Jan. 16.

Sec. Lieuts. to be Sec. Lieuts. (Grade B.), from (Ad.)—J. Ireland-Low; Jan. 11. H. P. Johnson, G. Thomas; Feb. 17. J. K. Thomson, C. W. Corbett, D. W. Genge; Feb. 18.

E. P. Ryan (Hon. Lieut. and Q.M., Lancs. Fus.) is granted a temp. commn. as Sec. Lieut. (Grade B.); Aug. 16, 1918, seniority from April 1, 1918.

The following are transf'd. to Unemployed List.—Sec. Lieut. A. E. Richardson; Jan. 22. Lieut. R. F. Sinclair; Jan. 26. Capt. A. R. Dresser; Jan. 29. Lieut. (actg. Capt.) P. C. Routley, Sec. Lieut. J. J. Speer; Jan. 31. Lieut. H. D. Roe, Sec. Lieut. W. G. Rogers, Capt. G. A. Scutt; Feb. 1. Lieut. R. D. Ronald; Feb. 3. Lieut. (actg. Capt.) D. Clark, Capt. J. H. P. Daman, Capt. W. S. Hedley; Feb. 4. Sec. Lieut. H. A. S. Fitch, Capt. D. Hodgson; Feb. 6. Lieut. T. H. Gladstone, Sec. Lieut. H. A. Sugden; Feb. 9. Sec. Lieut. H. D. McL. Hayward, Capt. W. H. M. Knox; Feb. 11. Sec. Lieut. O. C. Bown, Lieut. H. Haddon; Feb. 12. Sec. Lieut. R. D. Fleet; Feb. 13. Capt. I. N. Dracopolis, Sec. Lieut. B. F. Harrison; Feb. 14. Lieut. V. V. Cadman, Lieut. G. R. Cobb, Sec. Lieut. G. Colbert, Capt. H. E. O. Ellis, Capt. E. W. Wallford; Feb. 15. Capt. E. H. Cook; Feb. 17. Sec. Lieut. (Hon. Lieut.) R. C. Broughton; Feb. 18. Capt. A. G. Saxty, Sec. Lieut. W. S. Steljes; Feb. 19. Capt. W. H. Fenteman-Coates; Feb. 21.

Lieut.-Col. W. E. Jones relinquishes his commn. on account of ill-health; March 5.

Sec. Lieut. S. Barrow relinquishes his commn. on account of ill-health, and is permitted to retain his rank; March 5.

The initials of Sec. Lieut. (actg. Capt.) H. P. G. Leigh are as now described, and not as in *Gazette* Feb. 11.

The notifications in *Gazette* June 4, 1918, and Nov. 22, 1918, concerning Sec. Lieut. (Hon. Lieut.) (actg. Lieut.) H. H. Mitchell are cancelled.

The notification in *Gazette* June 25, 1918, concerning Sec. Lieut. (actg. Lieut.) W. G. Horton is cancelled.

Medical Branch

Capt. R. D. Goldie (Capt., R.A.M.C., S.R.) relinquishes his commn. on ceasing to be employed; Oct. 1, 1918.

Memoranda

Maj. M. O. Darby to be actg. Lieut.-Col. while holding a special appointment at the Ministry of Munitions; Jan. 21.

Lieuts. to be actg. Capts. (without the pay and allowances of that rank) while specially employed.—F. T. McElwee, R. J. Sladden; March 4.

The following are transferred to Unemployed List, from (S.O.)—Capt. S. J. Hern; Feb. 5. Lieut. (actg. Capt.) T. Jones; Feb. 13. Sec. Lieut. (actg. Capt.) H. B. Langton; Feb. 18.

London Gazette, March 7.

The following temporary appointments are made at the Air Ministry:—*Staff Officers, 2nd Class.*—(P.) Capt. (actg. Maj.) A. J. W. Barmby, and to retain his actg. rank while so employed; Jan. 31. (T.) Maj. (actg. Lieut.-Col.) A. Ap Ellis, and to relinquish the actg. rank of Lieut.-Col.; Feb. 19.

Staff Officer, 3rd Class.—(P.) Sec. Lieut. E. E. Page, and to be actg. Capt while so employed; Dec. 31, 1918.

The following temporary appointments are made:—*Staff Officer, 1st Class (Air).*—Lieut.-Col. W. E. MacNeece, D.S.O., D.F.C.; Jan. 16.

Staff Officer, 3rd Class (Q.).—Sec. Lieut. A. M. Goddard, and to be actg. Capt. while so employed; Feb. 5.

Air Attache.—Col. (actg. Brig.-Genl.) L. E. O. Charlton, C.B., C.M.G., D.S.O., and to retain temporarily the actg. rank of Brig.-Genl.; Feb. 19.

Flying Branch

Lieuts. to be actg. Capts., while employed as Capts. (A.)—A. S. Keep, M.C.; Dec. 30, 1918. L. L. Lindsay, from (S.O.); Feb. 1.

Sec. Lieuts. to be Lieuts.—J. P. Y. Dickey, A. K. Charlesworth, H. Dear, F. Dixon, F. Abrahams, L. E. O. Lounds, H. W. Heslop, J. D. Paterson, L. Michell, M.C.; April 2, 1918. J. H. Shaw; April 6, 1918. F. L. Bamber; April 15, 1918. K. E. Wright; April 16, 1918. H. E. A. Reynolds, S. N. Hill; April 21, 1918. T. Brandon, M.C.; April 26, 1918. I. R. L. Ross, D.F.C.; May 1, 1918. D. M. John; May 2, 1918. O. C. Dawson; May 4, 1918. R. N. Essell; May 8, 1918. J. S. Nicoll; May 13, 1918. G. R. Thornley, (Hon. Capt.) G. E. Haworth, and to retain his hon. rank; May 22, 1918. H. T. Hesketh; May 23, 1918. S. Jackson, M.C.; May 25, 1918. A. Brierecliffe; May 30, 1918. C. H. F. Nesbit; June 6, 1918. A. Bentley; June 7, 1918. S. Dumbell; June 11, 1918. V. A. Peers; June 25, 1918. E. L. Ward, M.C.; June 28, 1918. (Hon. Capt.) A. F. B. Broadhurst, and to retain his hon. rank; June 30, 1918. A. C. Orchin; July 1, 1918. A. G. MacGowan; July 7, 1918. F. Fletcher; July 9, 1918. P. M. Lindsay, A. D. Drew, T. G. Murray; July 11, 1918. R. P. H. West; July 25, 1918. J. L. Booth, A. C. D. Anderson; July 31, 1918. G. A. Randolph; Aug. 1, 1918. E. F. Murphy; Aug. 3, 1918. J. G. Prestwick; Aug. 12, 1918. F. H. Glover; Aug. 19, 1918. J. J. T. Rose, (Hon. Capt.) F. R. Ashmead, and to retain his hon. rank; Aug. 21, 1918. L. C. Pierce; Aug. 25, 1918. C. Berkeley; Aug. 26, 1918. A. P. Godfrey; Aug. 27, 1918. M. G. Penny, C. P. M. B. Caillard; Aug. 28, 1918. M. W. Nolan; Aug. 29, 1918. J. Whitehead, A. G. Foster-Sutton, B. E. Essex; Sept. 1, 1918. S. P. J. Yeats; Sept. 2, 1918. R. L. Hall; Sept. 12, 1918. J. J. Saunders; Sept. 13, 1918. (Hon. Capt.) H. P. Valintine, and to retain his hon. rank; Sept. 19, 1918. E. G. Tyler; Sept. 27, 1918. R. W. Ellis, E. R. Airey, C. C. Reynolds, M.M., R. Wannell, C. H. G. Sanders; Sept. 28, 1918. G. Adamson; Oct. 3, 1918. W. G. Humphries, M.C.; Oct. 13, 1918. W. J. P. Dicks, A. S. Moynihan; Oct. 14, 1918. W. F. Nicholas, D.C.M.; Oct. 15, 1918. W. R. Vane; Oct. 17, 1918. J. Cave; Oct. 18, 1918. N. Niven, J. Stephenson; Oct. 20, 1918. C. P. Bayne; Oct. 23, 1918. C. G. Bateson; Oct. 25, 1918. L. Allden; Oct. 26, 1918. C. J. Ralph, R. Tully; Oct. 27, 1918. E. C. H. Jones; Oct. 28, 1918. S. Horscroft, M.C.; Oct. 29, 1918. H. R. Owen; Nov. 1, 1918. C. H. Porter; Nov. 2, 1918. I. P. Anderson; Nov. 7, 1918. E. J. Suter; Nov. 8, 1918. D. G. Medus; Nov. 9, 1918. M. T. Stanley, E. E. Richardson, M.M., A. H. Day, R. G. Harris, I. H. Turkington, A. W. B. Singer; Nov. 30, 1918. J. W. Smith; Dec. 1, 1918. A. West; Dec. 4, 1918. J. A. Tomlinson; Dec. 21, 1918. C. G. Strange; Dec. 26, 1918. H. Stanners, M.M., T. T. Wishart, W. W. Naylor; Dec. 27, 1918. W. Cameron, G. C. Cooper, A. Murray, H. J. Rayment, J. B. V. Clements, D.F.C., D. A. Gordon; Jan. 1. A. V. Speight; Jan. 5. F. E. Spain, C. A. Holt, E. C. Hill-Clarke; Jan. 14. D. F. Brooks; Jan. 20. W. T. C. Blake, W. P. James; Feb. 1. J. F. Glemre, T. D. Sykes; Feb. 2. B. O. Davis, E. T. Hunt; Feb. 4. J. A. Massey; Feb. 15. G. A. Drewitt, J. C. Joynt, E. A. Sewell, B. E. Randall, A. W. Birch; Feb. 16. G. C. Hope; Feb. 20. A. Holdsworth; Feb. 21. J. Martin; Feb. 25. J. C. Langford; Feb. 26. L. S. Duffill, C. W. Phillips; Feb. 28. R. W. Mitchell; March 1.

Prob. Flight Officer H. Isherwood (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (A.); Oct. 23, 1918.

C. F. L. Chester (Lieut., R.W. Kent R.) is granted a temp. commn. as Sec. Lieut. (A.); Oct. 29, 1918, and to be Hon. Lieut. (substituted for notification in *Gazette*, Feb. 18).

R. Bounphrey (Capt., Lan. Hus., T.F.) is granted a temp. commn. as Sec. Lieut. (A.), and to be Hon. Capt.; Nov. 19, 1918 (substituted for notification in *Gazette* Dec. 17, 1918).

B. A. Foord, M.C. (Lieut., Lond. R., T.F.) is granted a temp. commn. as Sec. Lieut. (O.); Oct. 25, 1918, and to be Hon. Lieut.

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in their rank as Sec. Lieuts. (K.B.)—C. A. White, H. H. Howells; Aug. 8, 1918.

Sec. Lieut. L. C. Cody to be Sec. Lieut. (K.B.), from (Ad.); Oct. 19, 1918 (substituted for notification in *Gazette*, Jan. 31).

Sec. Lieut. H. Stirrup (late Gen. List, R.F.C., on prob.) is confirmed in his rank as Sec. Lieut. (Obs. Officer); April 1, 1918.

Sec. Lieut. A. E. Evans (late R.F.C., Gen. List) is confirmed in his rank as Sec. Lieut. (Obs. Officer); April 5, 1918 (substituted for notification in *Gazette*, Feb. 14).

W. S. Peel, M.C. (Lieut., Linc. R., S.R.) is granted a temp. commn. as Sec. Lieut. (Obs. Officer); June 1, 1918, and to be Hon. Lieut.

Flight Cadet 177148 W. McK. Auld is granted a temp. commn. as Sec. Lieut. (Obs. Officer); Nov. 5, 1918.

The following relinquish their commns. on ceasing to be employed:—Sec. Lieut. (Hon. Lieut.) G. S. Routhier, M.M. (Lieut. W. Ont. R.); Jan. 9. Sec. Lieut. (Hon. Lieut.) A. S. Robertson (Lieut., N. Bruns. R.); Jan. 13 (substituted for notification in *Gazette* Feb. 7).

Lieut. S. L. Shannon (Lieut., Sask. R.); Jan. 15. Lieut. G. S. Dee (Temp. Lieut., R. Dub. Fus.); Feb. 10.

Lieut. A. D. Ferguson (Lieut., H.L.I.); Feb. 12.

The following are transf'd. to Unemployed List:—

Sec. Lieut. C. E. Winter; Jan. 7. Lieut. F. H. Barlow (R. Lancs. R.); Jan. 9. Sec. Lieut. W. G. P. Dyson; Jan. 12. Capt. H. S. Ward; Jan. 15.

Sec. Lieut. T. W. Brodie; Jan. 18. Lieut. J. S. Hopper, Lieut. P. Smallwood; Jan. 19. Lieut. E. O. W. Hall, Sec. Lieut. J. Wilkinson; Jan. 22.

Sec. Lieut. H. Cavill, Sec. Lieut. J. P. Wardle, Capt. C. G. E. Yarde; Jan. 23. Sec. Lieut. C. H. Howell; Jan. 25. Sec. Lieut. A. P. Williams; Jan. 26. Sec. Lieut. H. Town; Jan. 27. Sec. Lieut. T. I. Irving, Sec. Lieut. M. A. Toomey; Jan. 28. Sec. Lieut. J. Thibaudau, Sec. Lieut. A. E. Tough; Jan. 29. Sec. Lieut. N. W. Churchill, Sec. Lieut. W. G. Davis; Jan. 30.

Lieut. G. H. Fozzard; Jan. 31. Sec. Lieut. W. A. Erskine, Sec. Lieut. J. P. Fullarton, Sec. Lieut. J. S. G. Holmes, Sec. Lieut. W. P. Jolly, Lieut. T. M. Winch; Feb. 1. Lieut. T. B. Dickson, Sec. Lieut. V. J. Fontannaz, Lieut. M. R. Stack; Feb. 2. Lieut. R. E. Conder, Lieut. E. A. Thain; Feb. 4.

Sec. Lieut. B. W. Berrington, Sec. Lieut. A. Brown, Lieut. C. L. Wilcox, Lieut. (Hon. Capt.) P. K. C. Wright; Feb. 5. Sec. Lieut. R. E. S. Gibson,

Lieut. E. Leighton; Feb. 6. Sec. Lieut. T. E. W. Browne, Sec. Lieut. A. Haines, Capt. A. B. Holcroft; Feb. 7. Lieut. F. C. Giles, Capt. S. Kemball; Feb. 8. Sec. Lieut. M. R. Jacobs, Lieut. (Hon. Capt.) R. B. Lockhart, Lieut. J. Cusby; Feb. 9. Sec. Lieut. H. E. Ford, Sec. Lieut. H. J. Fuller, Lieut. F. B. Huson, Sec. Lieut. R. O. Vasey; Feb. 11. Sec. Lieut. E. W. Handley, Lieut. R. W. W. Hardie, Lieut. R. A. Hodgson, Sec. Lieut. A. C. Irwin, Sec. Lieut. C. E. Taylor, Lieut. W. R. Walker, Lieut. T. M. Willett; Feb. 12. Lieut. R. B. R. Ashworth, Sec. Lieut. (Hon. Lieut.) A. Hanson, Sec. Lieut. L. W. Kersley, Sec. Lieut. (Hon. Lieut.) D. C. Lockwood (Notts and Derby, T.F.), Lieut. (actg. Capt.) T. K. Twist, M.C.; Feb. 13. Lieut. E. F. D. Adland, Sec. Lieut. V. T. H. French, Sec. Lieut. J. E. Hughes; Feb. 14. Lieut. A. L. Allan, Sec. Lieut. A. J. Aspinall, Lieut. A. B. Blanksby, Lieut. C. N. Burns, Lieut. H. B. Enderby, Sec. Lieut. E. A. Freitage, Sec. Lieut. C. Fortune, Capt. C. C. Gover, Lieut. S. A. Gilray, Lieut. (actg. Capt.) J. Hodgson, D.F.C., Lieut. (actg. Capt.) J. Hutchings, Sec. Lieut. R. B. Kennedy; Feb. 15. Sec. Lieut. C. G. D. Airey, Sec. Lieut. E. P. Caton, Sec. Lieut. M. W. Dunn, Sec. Lieut. P. E. Groom, Maj. P. G. Horswell; Feb. 16. Sec. Lieut. R. V. Dowding, Sec. Lieut. L. W. Gare; Feb. 17.

Lieut. H. F. Andrew, Lieut. V. D. Grant, Lieut. E. S. Jacobs, Lieut. F. C. Zink; Feb. 18. Lieut. C. A. Bainbridge, Lieut. M. H. Pailey, Sec. Lieut. A. W. Beaven, Sec. Lieut. C. V. Brearley, Sec. Lieut. J. W. Devlin, Lieut. C. G. Fraser, Sec. Lieut. A. Harman, Capt. A. W. C. Holcombe, Sec. Lieut. J. C. M. Hatfield, Sec. Lieut. J. Tullock, Lieut. C. C. T. Turner; Feb. 19. Lieut. F. Y. Banton, Lieut. F. C. D. Bridge, Lieut. B. D. Bennett, Sec. Lieut. R. M. Campbell, Sec. Lieut. E. Darby, Lieut. S. F. Garrett, Sec. Lieut. L. G. Gillam, Sec. Lieut. G. W. Lambert, Sec. Lieut. O. T. Lashmore, Capt. C. F. T. Walker; Feb. 20. Sec. Lieut. A. A. Bartram, Lieut. J. D. Currie (H.L.I.), Lieut. P. Dendy Norf. R.), Sec. Lieut. J. W. S. Gibbs, Sec. Lieut. P. Livingston, Capt. A. C. Workman; Feb. 21. Capt. E. W. Goldsworthy (City of London Yeo.), Lieut. P. D. MacA. Lingeman, Sec. Lieut. W. L. Stebbens, Lieut. H. L. Webster; Feb. 22. Sec. Lieut. J. N. Boanson, Sec. Lieut. P. H. Take; Feb. 23. Lieut. C. J. Agelasto, Sec. Lieut. E. J. Bowen; Feb. 24. Sec. Lieut. N. H. Allen, Lieut. H. W. Sangway, Lieut. A. C. Sharman E. Surr. R., T.F.); Feb. 25. Sec. Lieut. C. L. Arnold, Sec. Lieut. S. R. Byrne; Feb. 28. Sec. Lieut. C. H. Browne; March 3.

THE "BRISTOL AEROPLANE WORKS"

WHEN the late Sir George White became convinced of the great future of aviation, he backed his opinion in such practical form as to start a factory on a reasonable scale at Filton on the outskirts of Bristol. From this small initial start the scheme has ever since been moving in one direction only—expansion. And the magnificent works to-day stand as a monument of what brains and imagination when combined with capital can accomplish. One governing principle which was laid down upon the completion of the first shop has never been departed from, viz., quality in the first degree, and without doubt the success of the great organisation including the fine aerodrome which now exists under the control of those directing the British and Colonial Aeroplane Co., Ltd., has resulted in a large degree from this care of quality in every detail of construction. The other day we were enabled to inspect the various departments of the factory in operation, and from the first shop to the last no criticism other than praise would be justified in regard to the methods employed, and the orderly, without bustle or fuss, working of the varied departments, each as it proceeded smoothly, in contributing its unit to the famous Bristol machines as a whole. One of the most fascinating "shops" in the works was, perhaps, the small but comprehensive laboratory. There lay part of the secret of the maintenance of that quality on the material side of which the firm have so much reason to be proud. Another item, typical of the thoroughness of perfection exercised in the manufacture of all parts of the Bristol aeroplanes, was the demonstration of the balance of the Bristol propellers. To such a "pitch" of balance have these been brought that on a propeller fixed horizontally on a shaft, a tiny piece of emery paper, doubled over, was placed very gently on the upper edge of one of the blades, with the result that motion in a downward direction was immediately set up until the propeller came to rest in a vertical position.

Sir Stanley White, the Managing Director, through

illness, was unable to be present during the tour of the visitors through the works, but there were several "right hands" of the management under the guiding hand of Mr. H. White-Smith, to see that no item of moment was overlooked. Unfortunately the Clerk of the Weather had decided upon this special occasion, that the time for a climax to the dreariest winter on record had arrived, and had turned on every conceivable type of beastliness in the form of snow, pelting rain and violent winds from north, south, east and west, all at the same time. Therefore, had we to be content to inspect the four-engined Liberty triplane, the latest "creation" of the company, under its housing. This, however, was sufficient compensation for all the adverse efforts of the elements. That these "bombers," now to be converted into passenger-carrying machines, would have made equally good against the Huns as had the thousands of Bristol fighters turned out during the War, had not the Armistice stepped in and called a halt, there is no possible manner of doubt.

No need to describe in detail the machines themselves, as our "Milestones" of the Bristol creations have but recently been published, but it was with the greatest interest that we were able to witness and appreciate the organisation in all its numerous phases, a privilege which during the War has not been one easy of accomplishment. As in war, so, now that commercial aviation begins to loom large on the aerial horizon, the Bristol Co. are likely to maintain their eminent position as constructors for all-world requirements, and it should be but a comparatively brief period before the whole factory is once again at work at high pressure—this time in the interests of peace and progress—under the guidance of the powerful personnel of the company: Mr. Stanley White, Chairman of the Company, Sir G. Stanley White, Managing Director, Mr. H. White-Smith, a Director and the Secretary, Mr. Herbert J. Thomas a Director and Works Manager, and Capt. Barnwell, R.A.F., Engineer and Designer.

W.R.A.F. Clerks and Typists Wanted

THE Minister of Labour has been informed by the Air Minister that further recruits for the Women's Royal Air Force are now only required in the clerical categories, as clerks and typists. Applications for employment in these categories will be received through the employment exchanges, where full particulars of the vacancies concerned and of the terms and conditions of service are available.

The Longest Passenger Service

THE longest air service now running regularly is that between Vienna and Padua, a distance of 304 miles, claims the *Daily Mail* correspondent in Milan. Every three days two Capronis leave Vienna and two leave Padua, carrying mails and passengers.

Four Years' Flying in Switzerland

It is a little surprising, bearing in mind the nature of the country, and the fact that it is a neutral nation, to hear that during the 4½ years of War there were 40,111 flights made in Switzerland. In the aggregate these flights represent 9,508 hours of flying, while the distance covered was 1,045,895 kilometres, about 27 times the distance round the world.

The Flying Surgery

THE flying ambulance has been with us for some time, and last week trials were carried out at Vill coublay with a new Voisin designed and fitted up to carry all the necessary equipment of a surgeon. The machine was flown by Frantz, and, after landing, his two passengers—MM. Nemirowsky and Tilmant—in a few minutes had disembarked and set up the surgical equipment, of which they are the designers, in readiness for an operation.

King Albert Flies to Aix-la-Chapelle

For a brief visit to Aix-la-Chapelle on Sunday week,

King Albert availed himself of the aeroplane. He flew from Brussels to Aix in 50 minutes, and after visiting the headquarters and the town he returned by the air-way to the Belgian capital.

A Washington-New York Record

COL. DARGUE and Lieut. Lucas are said to have broken the record for non-stop official flights between Washington and New York by making the trip in 80 minutes.

Fast Flying in the U.S.

A BRIEF message from New York announces that on March 7 Major Fleet and Captain White flew an aeroplane from Dayton, Ohio, to Mineola, New York, a distance of 664 miles, in 4 hrs. 33 min. actual flying time. They made one stop at Newburg for minor repairs. On the trip they encountered snow, wind and fog, which took them a hundred miles off their course.

A Speedy Climber in the United States

ACCORDING to a report from Washington, a new single-seated biplane built for the United States War Department has attained an officially-timed speed of 163½ miles an hour, climbing 10,000 ft. in 4 min. 52 sec. Further particulars of this machine, as well as confirmation of these remarkable figures, will be awaited with considerable interest.

"Aerial Smuggling"

In regard to this interesting article by Capt. Marr, which appeared in last week's issue of *FLIGHT*, it should be noted that this was originally written about the middle of last year, and was only slightly revised subsequent to the Armistice, as it was thought a sufficiently strong *precis* of the position, irrespective of any subsequent happenings and suggestions in regard to the laws, etc., of the air.

SIDE-WINDS

ON Thursday, the 20th inst., the Society of British Aircraft Constructors are giving an Aircraft Industry banquet at the Savoy Hotel. It should be one of the most unique functions of the year, having regard to the progress of aviation in the past few years. Amongst those who have already accepted invitations to be present are the Right Hon. Winston S. Churchill, Maj-Gen. Seely, Lord Weir, besides the cream of high air officials who will find it possible to be in London on that day.

It was interesting to notice that on the occasion of the recent launching of the new airship, R. 33, by Messrs. Armstrong, Whitworth and Co., at Selby, every precaution was taken for the success of the trip, the mascot apparently being the manager, Mr. Golightly, who was included in the list of passengers, surely because of his appropriate name! Anyway, the launch was a credit to all concerned. By the way, this important firm evidently intends to continue its career as builders of all kinds of aircraft, for they have recently issued a most excellent compilation of their aviation products, well illustrated, which will be studied with great interest by possible purchasers. We fancy we see in this publication the work of the enterprising and indefatigable general manager, Capt. Fairbairn Crawford.

OLD habitués of Hendon will learn with pleasure that Mr. Marcus D. Manton has now returned to the scenes of his former exploits, having joined the Aircraft Manufacturing Co. as a testing and demonstration pilot. It will be remembered he was for long the chief pilot of the Grahame-White Co., and no flying meeting was complete without him. He did excellent pioneer work and achieved the reputation as one of our foremost aviators, and since the beginning of the War has worked hard and done great service to the Air Forces. For over two years he has been at Cowes, engaged chiefly on seaplane work, and now that he returns to Hendon he will have the best wishes of a large circle of old friends for his continued success. He recently had the misfortune to lose his father, and has also been seriously ill, but is now in good form once more.

WITH his unique experience as pilot, designer and manufacturer, extending over the last ten years, Mr. E. C. Gordon England is able to bring his special knowledge to bear on many aviation problems. He has now established offices at St. George's House, 193, Regent Street, W.1, where he may be consulted on any matters connected with commercial or pleasure flying.

OWING to the re-arrangement of their sheet-metal department, a well-known firm find they have to dispense with the services of their assistant works manager—a first-class man able to take charge of an aero or motor vehicle sheet-metal works. They are anxious to recommend him for a position of trust, where a thorough knowledge of the industry is required. We shall be pleased to pass on any enquiries to the right quarter.

FROM Messrs. Thomas Robinson and Son, Ltd., of the Railway, Works, Rochdale, comes a beautiful catalogue, which has been specially prepared for the Lyons Fair. It contains photographs and details of a very large selection of wood, working machinery which is the speciality of this firm. All the printed matter is in French, of course, and the whole is not only a splendid example of British printing, but it reflects great credit upon the foresight and enterprise of this firm. Messrs. T. Robinson and Son have always been noted for the excellence of their catalogues, which do really give useful information to those who are seeking wood-working machinery of any kind, and they are always willing to render any assistance to prospective clients.

R.A.E. "Old Boys."

A RE-UNION of old members of the staff of the R.A.E. (late R.A.F.) took place at the Coventry Restaurant, Rupert Street, on Friday last, the 7th inst., on the occasion of the first annual dinner. There was an attendance of seventy. On the proposition of Major S. Heckstall-Smith, seconded by Capt. L. Hall, it was unanimously decided that an "Old Boys" Society should be formed, with a view to its members meeting periodically.

It is hoped that all old members of the staff of the R.A.E. will forward their names and addresses, with the approximate dates of their service at the factory, to Mr. H. H. W. Vowden, 13, Bruton Street, W., in order that a definite move in the formation of the Society be made at once.

COMPANY MATTERS

J. Samuel White and Co.

THE directors of J. Samuel White and Co. have decided to make a cash bonus distribution of 5s. per share (less tax) on the total ordinary share capital.

NEW COMPANIES REGISTERED

AERIAL INDICATORS, LTD., 16, Regent Street, S.W.—Capital £6,500, in 3,500 preference shares of £1 and 0,000 deferred shares of 1s. Manufacturers of aeronautical maps, signals, indicators, etc. Secretary, A. W. Browne.

CROYDON AVIATION AND MANUFACTURING CO., LTD., 2, Gresham Buildings, Guildhall, E.C.—Capital £20,000, in £1 shares (10,000 6 per cent. cumulative preference). Acquiring business of the Croydon Aviation and Engineering Co., Ltd. First directors: J. T. Cox, J. C. Smith, F. Lynch, and H. J. De Courcy Moore.

REP PLUGS, LTD., 23, Warren Street, W.—Capital £5,000, in 4,500 shares of £1 and 10,000 founders of 1s. each. Manufacturers of sparking plugs, manufacturers of devices and appliances for aerial and water navigation, etc. Managing director: L. Ripault.

S. X. MOTOR AND GENERAL TRANSPORT CO., LTD.—Capital £2,000, in £1 shares. Manufacturers of and dealers in motors and flying machines, carriers, etc. First directors: L. H. Hatting and J. F. Finch.

Aeronautical Patents Published

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m = motors.

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published March 13, 1919.

- 2,846. DUNLOP RUBBER CO. and W. H. PAULL. Undercarriages. (123,174.)
3,187. SOC. ANON. DES ETAB. L. BLERIOT. Transmission gear for shafts. (120,544.)
3,426. CURTISS MOTOR CO. Hydro-aerial machines. (113,965.)
4,006. S. E. SPENCER. Apparatus for indicating any variation from horizontal in aeroplanes. (123,203.)
13,641. W. R. D. SHAW. Aeroplanes. (123,278.)

Index and Title Page for Vol. X.

The 8-page Index for Vol. X of "FLIGHT" (January to December, 1918) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C.2. Price 8d. per copy, post free.

NOTICE TO ADVERTISERS

IN order that "FLIGHT" may continue to be published at the usual time, it is now necessary to close for Press earlier. All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages liii, liv, lv and lvi).

FLIGHT

and The Aircraft Engineer,

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